The PHOTOFACT Servicer

SET 436 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ MAR 15, 1959

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

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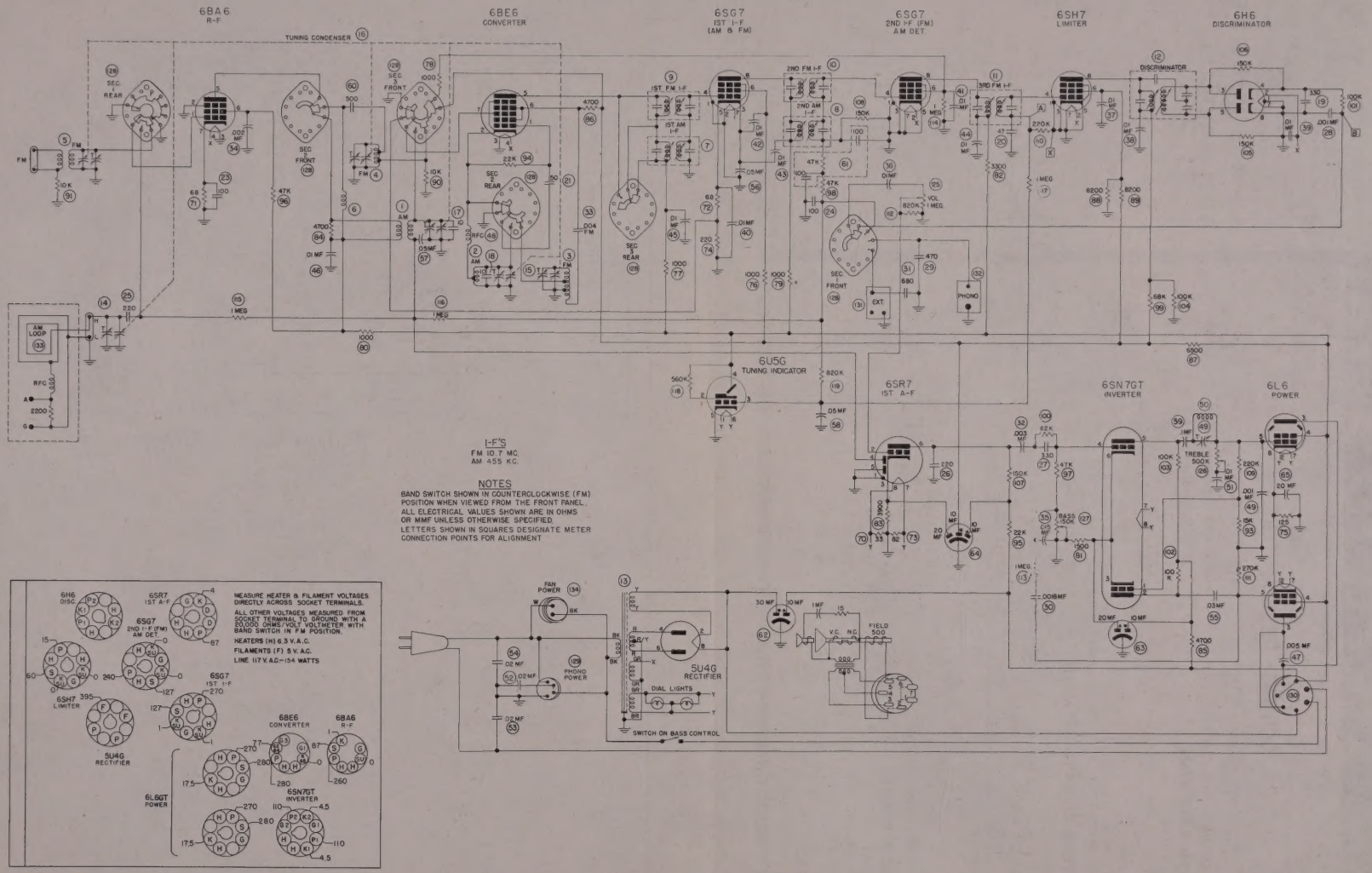
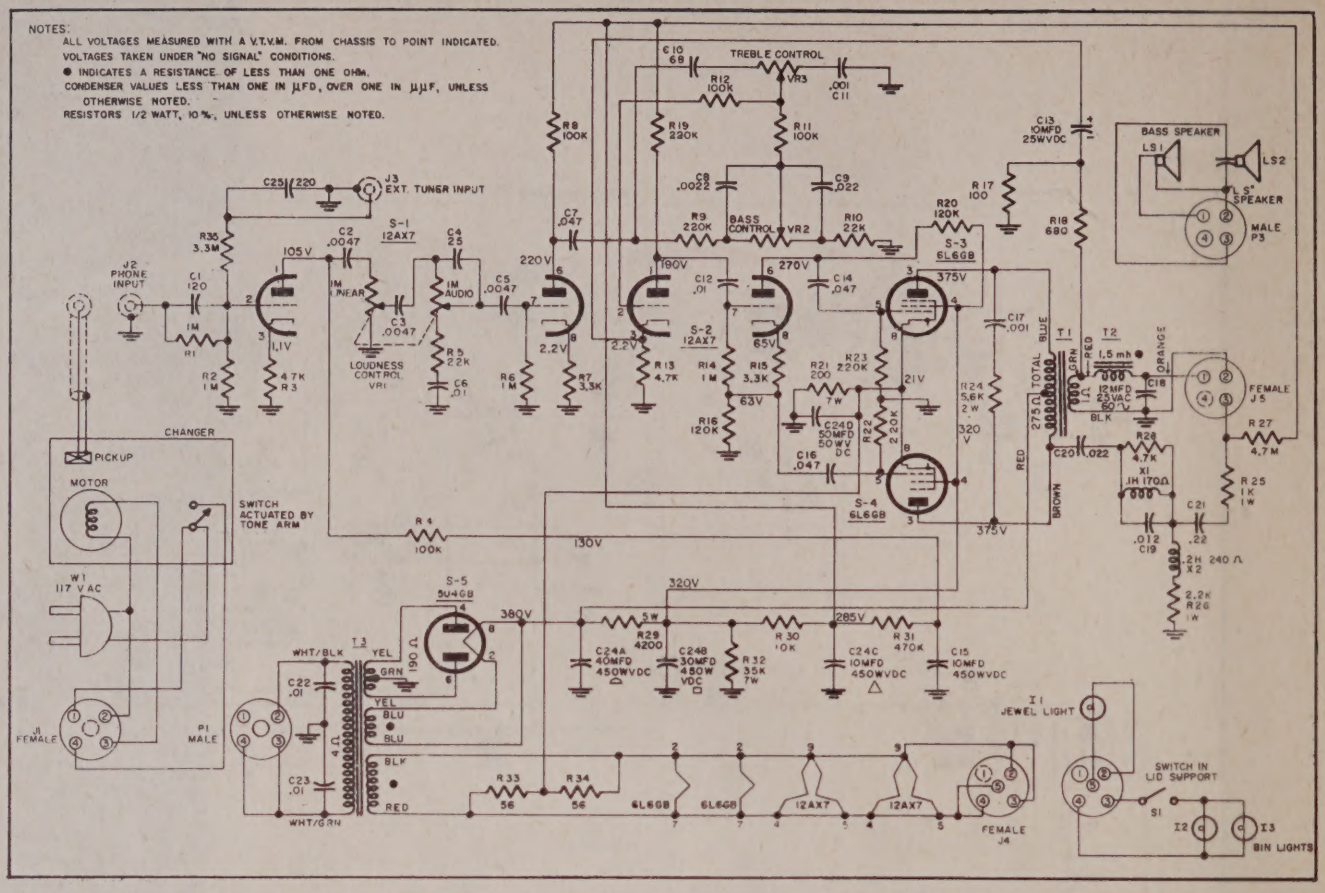
MAGNAVOX
CHASSIS CR223A, B, C, D, E, F

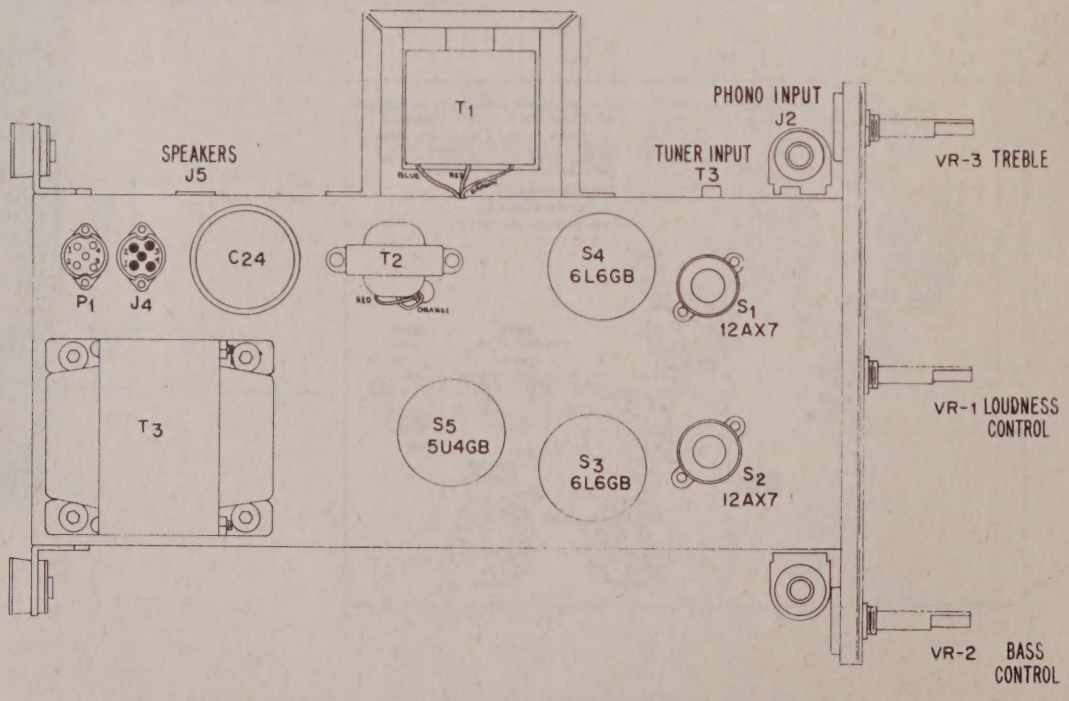


MAGNAVOX CHASSIS CR223A, B, C, D, E, F

Schematic Diagram Courtesy of MAGNAVOX CO.



PHILCO MODEL E-1776



Schematic Diagram Courtesy of PHILCO CORP.

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

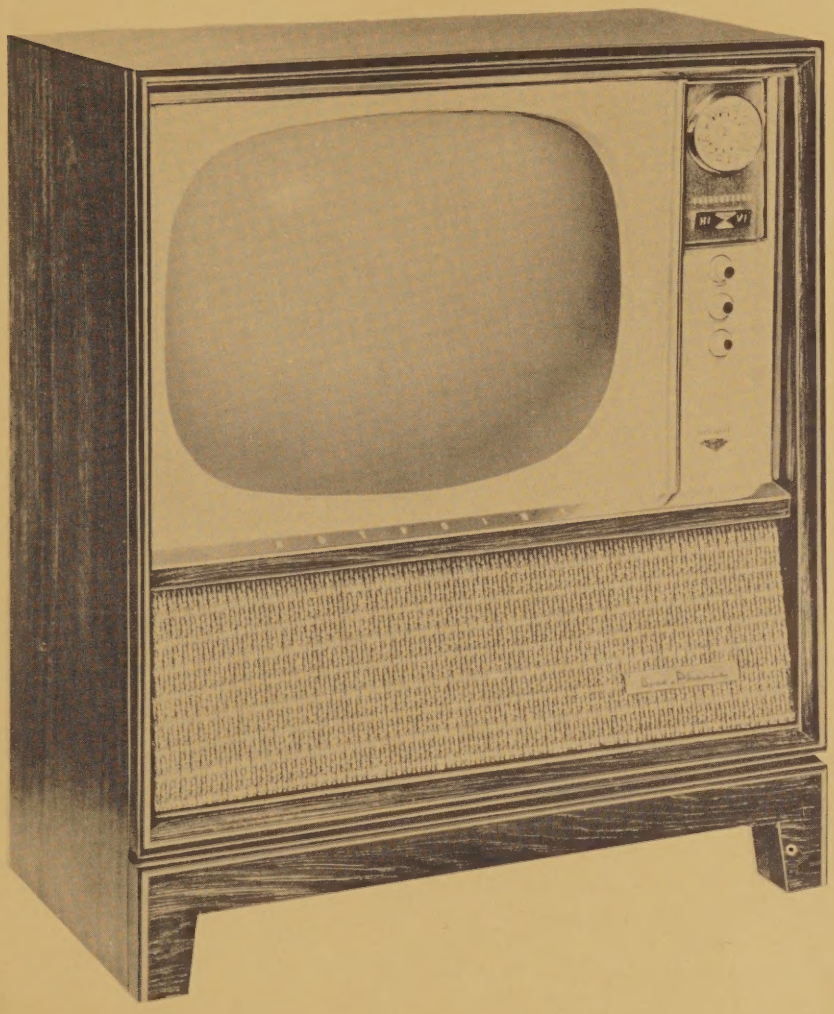
HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



MODEL 21S560 (U3 Line)

HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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SET 436 FOLDER 1

PHOTOFACT* Folder with CIRCUITRACE*

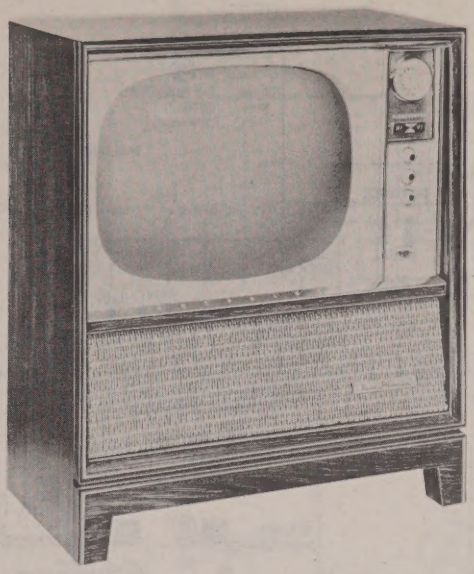
HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type knobs from the front.
2. Remove Remote Control unit from the rear.
3. Remove 10 wood screws holding rear cover. Remove the rear cover.
4. Remove speaker leads.
5. Remove 2 hex nuts holding picture tube bracket at the top.
6. Remove 2 metal screws holding chassis support bracket at the top left side.
7. Remove 5 bottom chassis bolts.
8. Remove chassis.



MODEL 21S560 (U3 Line)

TRADE NAME	Hotpoint Models 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)
MANUFACTURER	Hotpoint Co., 5600 W. Taylor St., Chicago 44, Illinois
TYPE SET	Television Receiver with Remote Control
TUBES	VHF - Seventeen, UHF - Eighteen
POWER SUPPLY	110-125 Volts AC, 60 Cycle RATING TV: 210 Watts, 1.9 Amp. @ 117 Volts AC White Tuning: 240 Watts, 2.3 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF Oscillator, it is necessary to remove the chassis from the cabinet. (See disassembly instructions.)

SAFETY GLASS REMOVAL

Remove 4 metal screws holding metal trim at bottom of the safety glass. Pull safety glass out at the bottom and remove.

SPECIAL ADJUSTMENTS

A. AGC
The AGC can be varied by means of a Local-Distant switch. Additional attenuation can be achieved by cutting the jumper wire connected across a 2.2meg resistor (R40).

B. Focus
The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

C. Width
The width may be varied by means of Width switch. (For location, see tube placement chart.)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Multivibrator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Ratio Detector secondary (A11) located on top of chassis.

FUSE

Two fuses and a fuse wire are used for low voltage power supply, horizontal sweep and filament protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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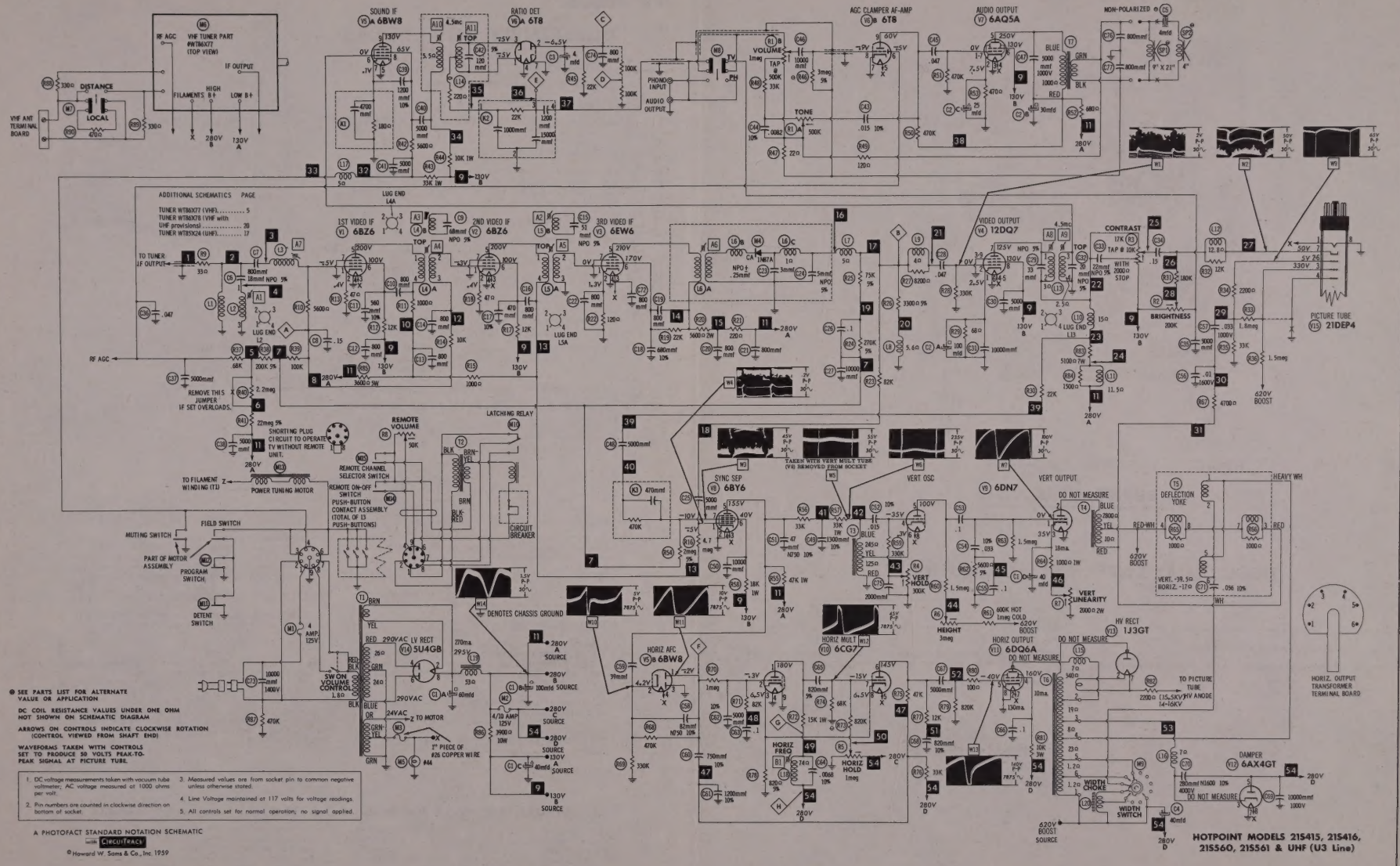
SET 436 FOLDER 1


HOTPOINT MODELS 215415, 215416, 215560, 215561 & UHF (U3 Line)
HOTPOINT MODELS 215415, 215416, 215560, 215561 & UHF (U3 Line)
FOLDER 1
ADDITIONAL SCHEMATICS PAGE
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TUNER WT86X78 (VHF with UHF provisions)..... 20
TUNER WT85X24 (UHF)..... 17
SOUND IF V5A 6BW8
RATIO DET V6A 6T8
AGC CLAMPER AF-AMP V6B 6T8
AUDIO OUTPUT V7 6AQ5A
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 6BZ6
3RD VIDEO IF V3 6EW6
VIDEO OUTPUT V4 12DQ7
SYNC SEP V9 6BY6
VERT OSC V9 6DN7
VERT OUTPUT
HORIZ AFC V5B 6BW8
HORIZ MULT V10 6CG7
HORIZ OUTPUT V11 6DQ6A
HV RECT 1J3GT
DAMPER V12 6AX4GT
LV RECT V14 5U4GB
PICTURE TUBE V15 21DEP4
VHF TUNER PART #WT86X77 (TOP VIEW)
REMOTE VOLUME
REMOTE CHANNEL SELECTOR SWITCH
REMOTE ON-OFF SWITCH PUSH-BUTTON CONTACT ASSEMBLY (TOTAL OF 13 PUSH-BUTTONS)
SHORTING PLUG C1 CIRCUIT TO OPERATE TV WITHOUT REMOTE UNIT.
POWER TUNING MOTOR
LATCHING RELAY
CIRCUIT BREAKER
MUTING SWITCH
FIELD SWITCH
PART OF MOTOR ASSEMBLY
PROGRAM SWITCH
DETENT SWITCH
SW ON VOLUME CONTROL 1.6Ω
DENOTES CHASSIS GROUND
TAKEN WITH VERT MULT TUBE (V8) REMOVED FROM SOCKET
DO NOT MEASURE
HEIGHT
VERT LINEARITY
HORIZ FREQ
HORIZ HOLD
WIDTH CHOKE
WIDTH SWITCH
CONTRAST
BRIGHTNESS
DEFLECTION YOKE
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD
TO PICTURE TUBE 19V ANODE 14-16KV
620V BOOST
280V A SOURCE
280V B SOURCE
280V C SOURCE
280V D SOURCE
130V A SOURCE
130V B SOURCE
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
CIRCUITRACS
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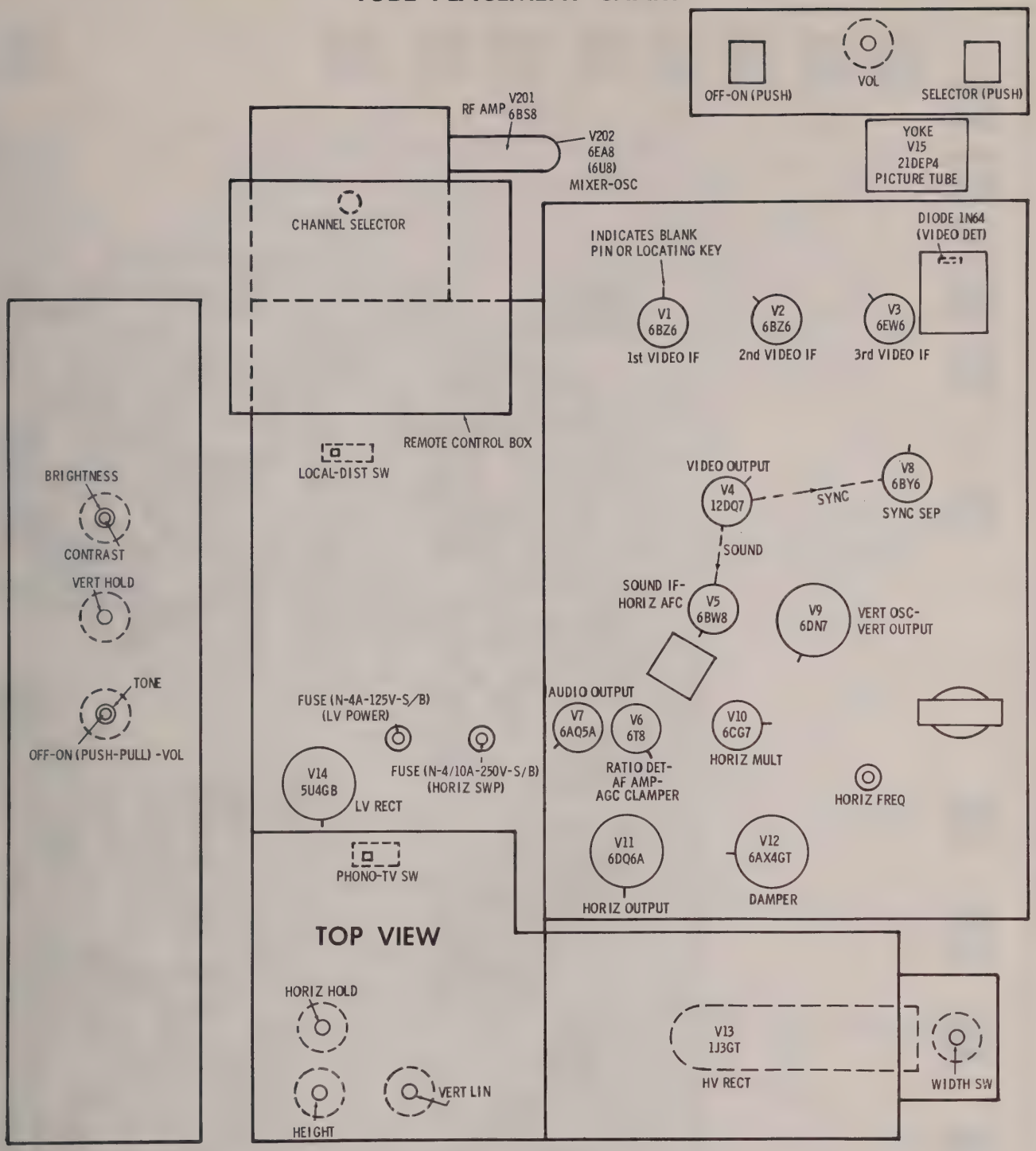
TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound Fuse (4A), Fusible Wire (Fil), V14

SWEEP FAILURE
No raster, has sound V5, V10, V11, Fuse (4/10A), V12, V13, V15
No vertical deflection V9
Poor vert. linearity or foldover V9
Poor horiz. linearity or foldover V10, V11, V12
Narrow picture V10, V11, V12, V14
Vert. off freq. V9
Horiz. off freq. V10

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.), V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V15
Has pic, no sound V5, V6, V7
Overloaded picture V6

SYNC FAILURE
No vert. sync V8, V9
No horiz. sync V8, V5
No vert. or horiz. sync V8

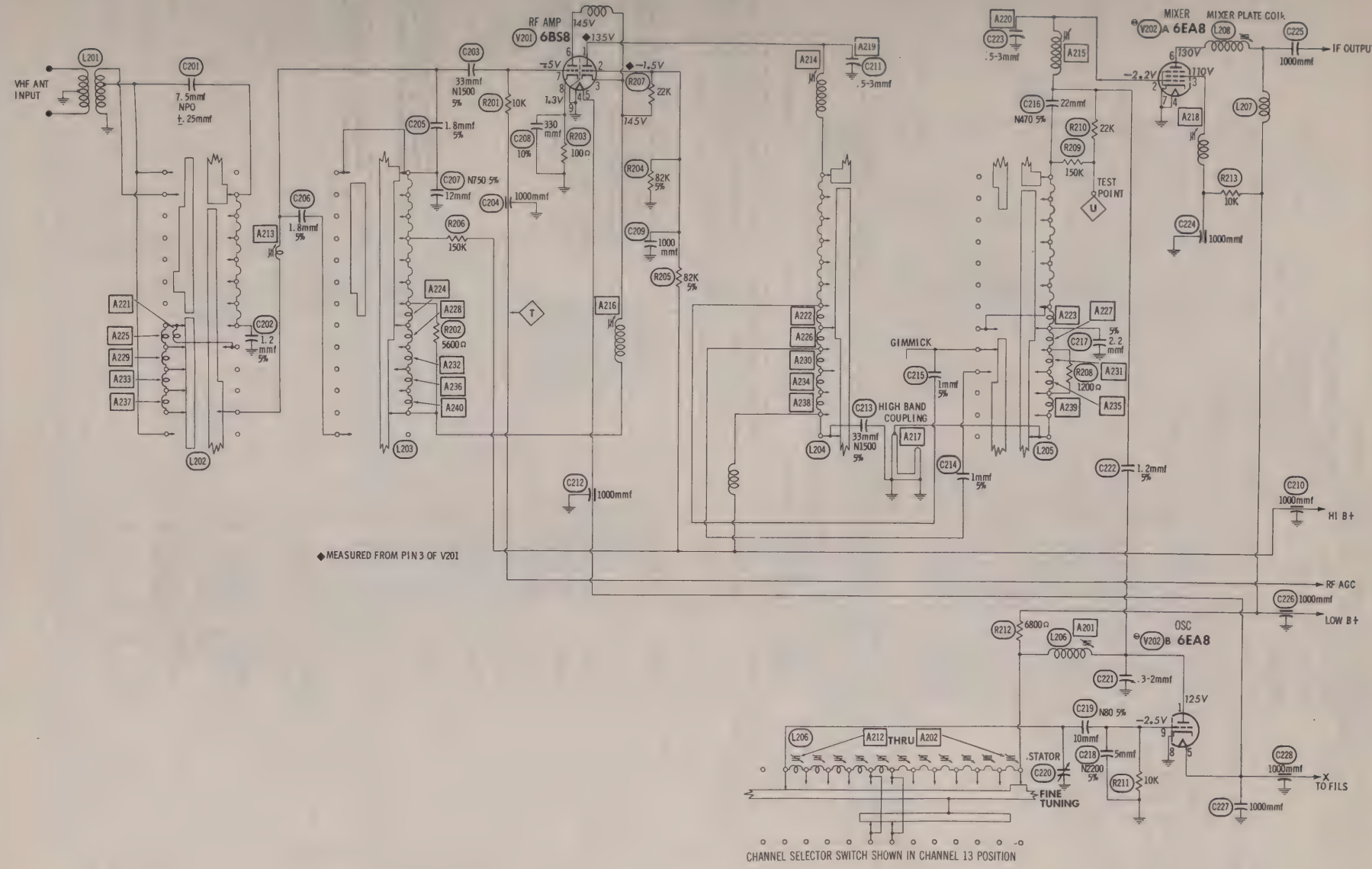
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED.

PRINTED BOARD

HOTPOINT MODELS 215415, 215416, 215560, 215561 & UHF (U3 Line)

FOLDER 1

A Howard W. Sams CIRCUITRACE Photo



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER WT86X77

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools:

A201 thru A212	General Cement #5097, 8727 Walsco #2515
A213, A214, A215, A216	General Cement #8607, 9291 Walsco #2520, 2522, 2523, 2524, 2537
A217, A218	General Cement #5000, 5003, 8276, 8290 Walsco #2512, 2525

VHF OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Set Contrast two-thirds from full counterclockwise rotation.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

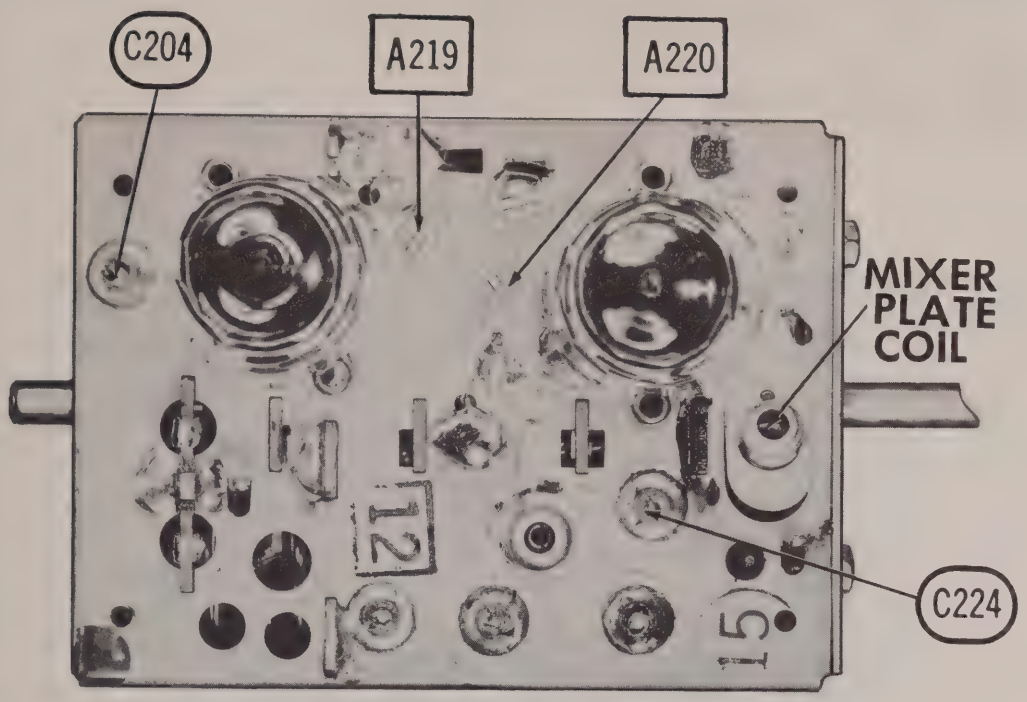
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across antenna terminals thru matching network (Fig. 201).	213MC	211.25MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place video marker at 45% as in Fig. 202.
			207MC	205.25MC	12		A202	
			201MC	199.25MC	11		A203	
			195MC	193.25MC	10		A204	
			189MC	187.25MC	9		A205	
			183MC	181.25MC	8		A206	
			177MC	175.25MC	7		A207	
			85MC	83.25MC	6		A208	
			79MC	77.25MC	5		A209	
			69MC	67.25MC	4		A210	
			63MC	61.25MC	3		A211	
			57MC	55.25MC	2		A212	

VHF RF AND MIXER ALIGNMENT

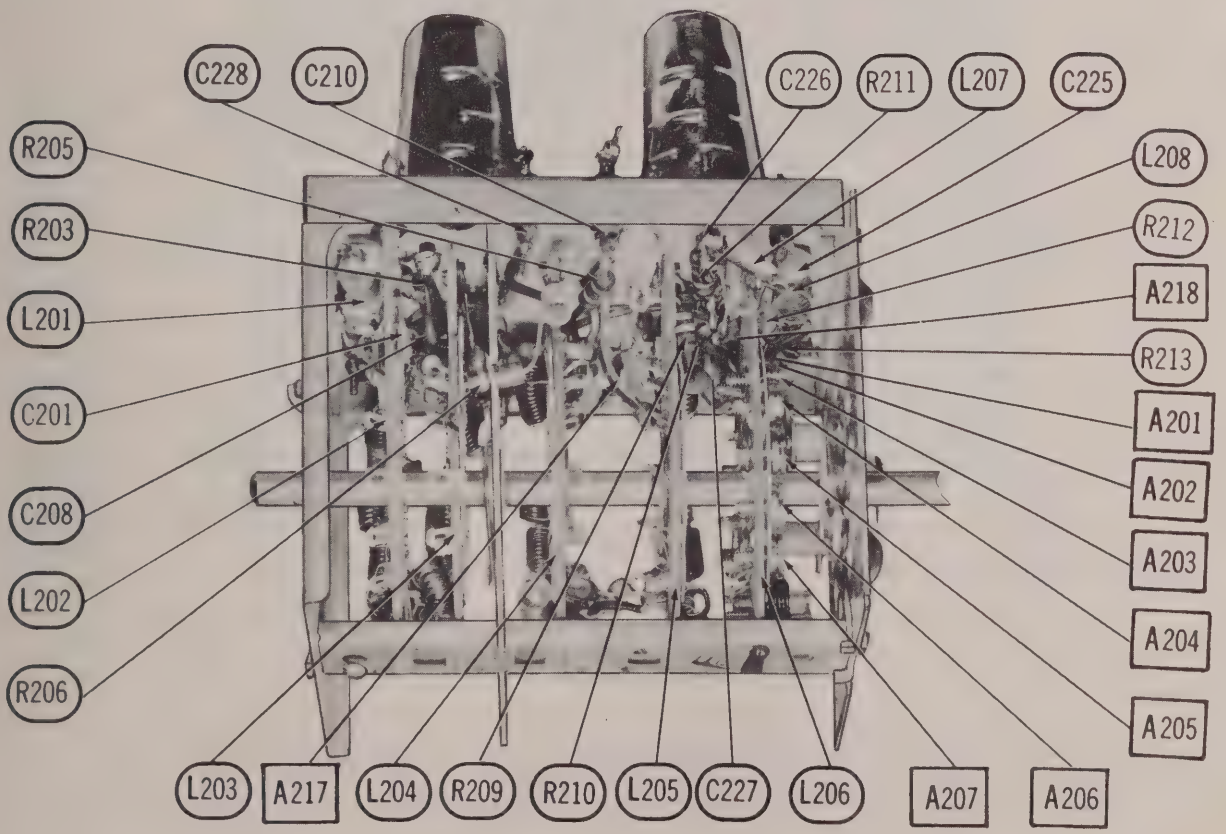
Connect the negative lead of a 3 volt bias supply to point ⓣ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Fig. 201	Across antenna terminals thru matching network (Fig. 201).	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point ⓥ . Low side to chassis.	A213, A214, A215, A216, A217, A218	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown. A217 adjusts bandwidth, A218 controls tilt.
3.	"	"	177MC	175.25MC 179.75MC	7	"	A219, A220	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown. Retouch A213 for maximum gain and equal peaks.
4.	"	"	207MC	205.25MC 209.75MC	12	"		Make compromise adjustments of A213 thru A217 and/or A219 and A220, if necessary. Replace tuner shield when checking response
			201MC	199.25MC 203.75MC	11			
			195MC	193.25MC 197.75MC	10			
			189MC	187.25MC 191.75MC	9			
			183MC	181.25MC 185.75MC	8			
5.	"	"	85MC	83.25MC 87.75MC	6	"	A221, A222, A223, A224	Adjust for maximum gain and symmetry of response similar to Fig. 204 with markers as shown. Adjust bandwidth by positioning "Gimmick".
6.	"	"	79MC	77.25MC 81.75MC	5	"	A225, A226, A227, A228	Adjust for maximum gain and symmetry of response similar to Fig. 204. with markers as shown.
7.	"	"	69MC	67.25MC 71.75MC	4	"	A229, A230, A231, A232	"
8.	"	"	63MC	61.25MC 65.75MC	3	"	A233, A234, A235, A236	"
9.	"	"	57MC	55.25MC 59.75MC	2	"	A237, A238, A239, A240	"

continued PAGE 19



TUNER WT86X77 - TOP VIEW



TUNER WT86X77 - LEFT SIDE

TUNER PARTS LIST AND DESCRIPTIONS

WT 86X77

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BS8	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6EA8	6U8 *

* Alternate.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	HOTPOINT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	7.5		WT18X400					5TCCB-V75S ±.25mmf *	NPO ±.25mmf
C202	1.2		WT21X22					5TCCB-V12S 5%*	5%
C203	33		WT18X293		TCL-33				N1500 5%
C204	1000		WT23X8	EF-001	MFT-1000			503C-DI	
C205	1.8		WT21X16					5TCCB-V18S 5%*	5%
C206	1.8		WT21X16					5TCCB-V18S 5%*	5%
C207	12		WT18X284			C10Q12U	CN7-412	5TCU-Q12S 5%*	N750 5%
C208	330		WT18X328	DI-330	DD-331	L10T33	JL-333	5GA-T33S 10%*	10%
C209	1000		WT18X317	BPD-001	DD-102	BYA10D1M	B-210	5GA-DI	
C210	1000		WT23X8	EF-001	MFT-1000			503C-DI	
C211	.5-3		WT30X30		829-3		CT565A		
C212	1000		WT23X8	EF-001	MFT-1000			503C-DI	
C213	33		WT18X284		TCL-33				N1500 5%
C214	1.0		WT21X24		TCZ-1			5TCCB-V1S 5%*	5%
C215	1.0		WT21X24		TCZ-1			5TCCB-V1S 5%*	5%
C216	22		WT18X402						N470 5%
C217	2.2		WT21X23		TCZ-2R2	C10Q22C		5TCCB-V22S 5%*	5%
C218	5		WT18X362						N2200 5%
C219	10		WT18X360						N80 5%
C220			WT2X101						Stator
C221	.3-2		WT30X45						
C222	1.2		WT21X22					5TCCB-V12S 5%*	5%
C223	.5-3		WT30X30		829-3		CT565A		
C224	1000		WT23X8	EF-001	MFT-1000			503C-DI	
C225	1000		WT18X284	BPD-001	DD-102	BYA10D1M	B-210	5GA-DI	
C226	1000		WT23X8	EF-001	MFT-1000			503C-DI	
C227	1000		WT18X284	BPD-001	DD-102	BYA10D1M	B-210	5GA-DI	
C228	1000		WT23X8	EF-001	MFT-1000			503C-DI	

* Not normally in distributors stock. Available through distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

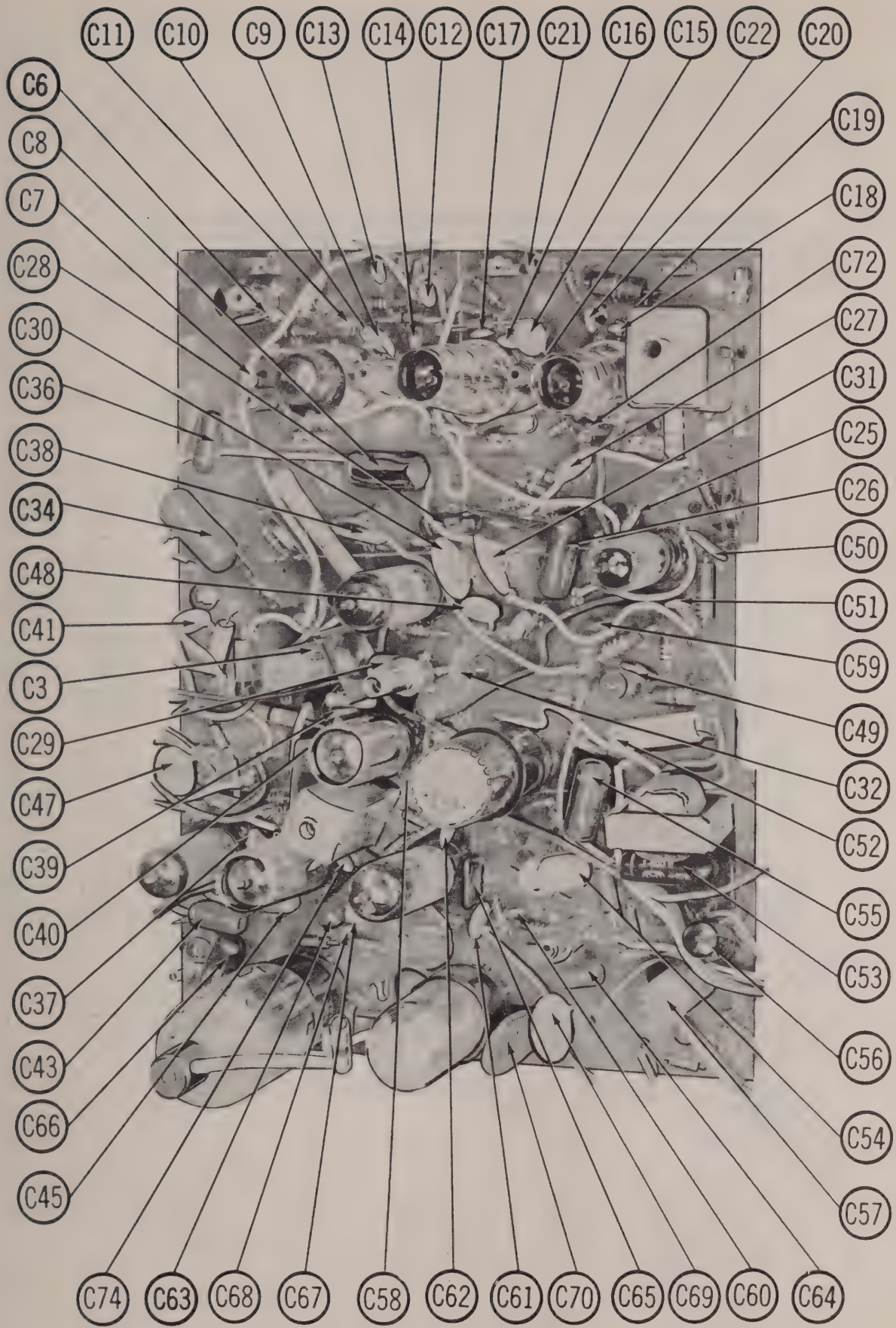
ITEM No.	RATING		HOTPOINT PART No.	NOTES
	OHMS	WATT		
R201	10K			
R202	5600Ω			
R203	100Ω			
R204	82K 5%			
R205	82K 5%			
R206	150K			
R207	22K			

ITEM No.	RATING		HOTPOINT PART No.	NOTES
	OHMS	WATT		
R208	1200Ω			
R209	150K			
R210	22K			
R211	10K			
R212	6800Ω			
R213	10K			

COILS (RF-IF)

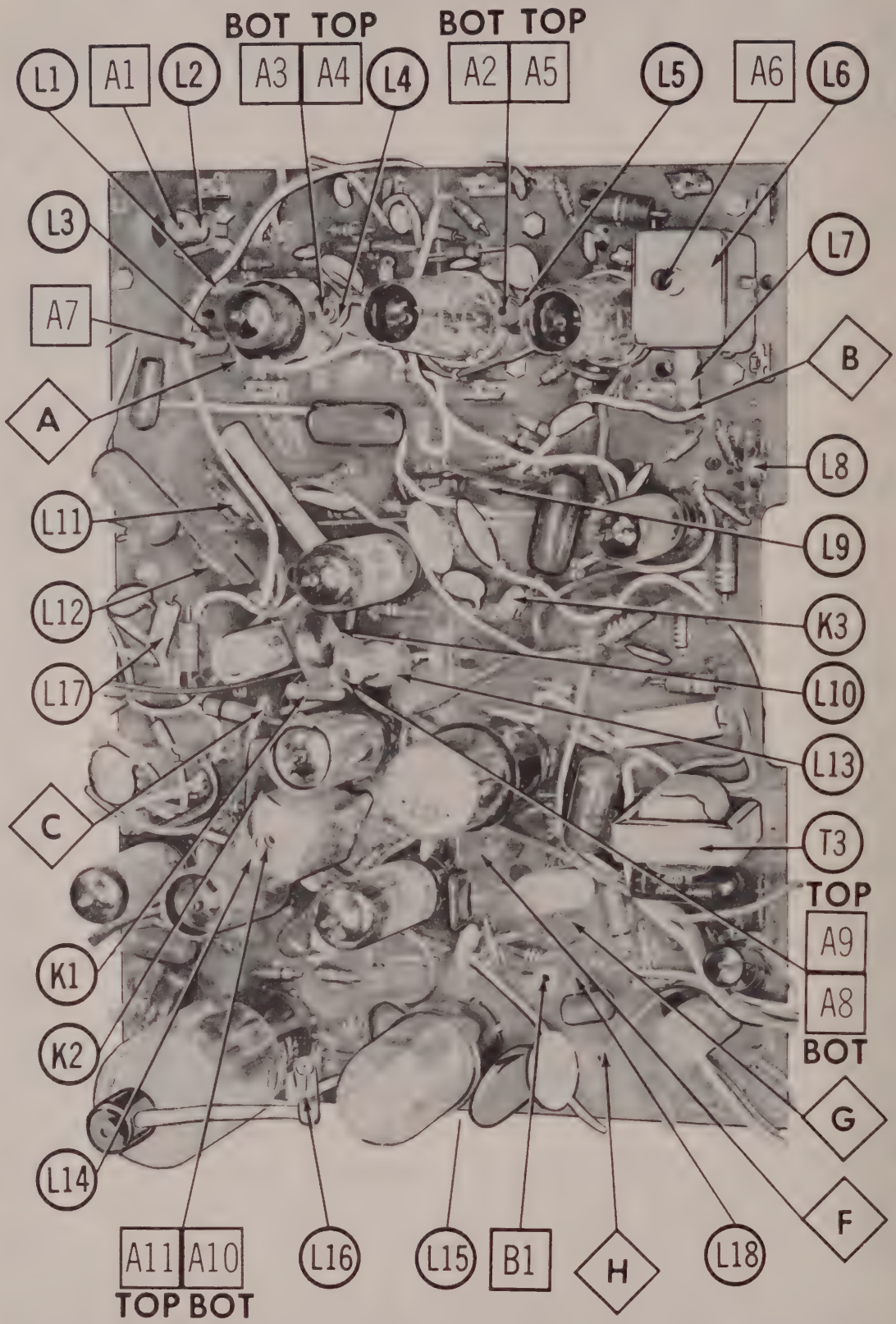
ITEM No.	USE	HOTPOINT PART No.	NOTES
L201	Ant. Trans.	WT37X23	
L202	Ant. Coils	WT52X136	Channel 2-13 Includes wafer assy.
L203	1st RF Coils	WT52X135	Channel 2-13 Includes wafer assy.
L204	2nd RF Coils	WT52X134	Channel 2-13 Includes wafer assy.

ITEM No.	USE	HOTPOINT PART No.	NOTES
L205	Mixer Grid	WT52X133	Channel 2-13 Includes wafer assy.
L206	Osc. Coils	WT52X132	Channel 2-13 Includes wafer assy.
L207	RF Choke	WT36X299	
L208	Mixer Plate	WT36X307	



PRINTED BOARD - CAPACITOR IDENTIFICATION

SET 432 FOLDER 1



PRINTED BOARD - INDUCTOR & ALIGNMENT IDENT

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: Al thru All ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Set the Volume control fully counterclockwise.
Set the Fine Tuning control fully counterclockwise.
Set the Contrast control fully clockwise.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Remove the Horizontal Output tube (V11) to reduce shock hazards.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
If a slug has two peak positions, use the one with the slug farthest out of form.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	44.0MC (10MC Swp)	47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis. (Across Video Det. load)	A1, A2	Adjust for MINIMUM amplitude at marker.
2.	"	"	"	41.25MC	"	"	A3	"
3.	"	"	"	42.5MC	"	"	A4	Adjust to place marker at 60% on curve as in Fig. 1.
4.	"	"	"	45.75MC	"	"	A5	Adjust to place matker at 45% on curve as in Fig. 1.
5.	"	"	"	42.5MC 45.75MC	"	"	A6	Adjust for proper tilt and symmetry as in Fig. 1.
6.	"	"	"	45.75MC	"	"	A7, & Mixer Plate Coil	Adjust A7 and Mixer Plate Coil for maximum gain at 45.75MC marker. Repeat steps 3, 4, 5 and 6. Replace V11.

4.5MC TRAP ALIGNMENT

Turn the Contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel	Vert. Amp. thru detector network (Fig. 2) to pin 7 (cathode) of picture tube. Low side to chassis.	A8	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT

A weak TV station signal should be substituted for the signal generator, if possible.
The speaker should be connected during alignment.
Connect the two matched 100K (±1%) resistors in series from point (C) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01mfd	High side to point (B). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (C). Common to chassis.	A9, A10	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (E). Common to point (D).	All	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 8 and 9.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6 & 19.

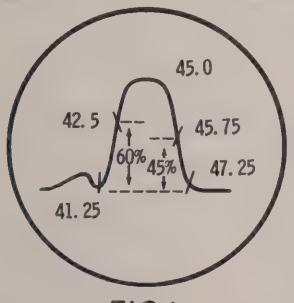


FIG. 1

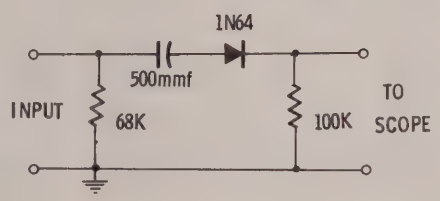


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF	6BZ6	
V2	2nd Video IF	6BZ6	
V3	3rd Video IF	6BW6	
V4	Video Output	12DQ7	
V5	Sound IF Amp. -Horiz. AFC	6BW6	
V6	Ratio Det. -AGC Clamper-AF Amp.	6T8	

ITEM No	USE	TYPE	NOTES
V7	Audio Output	6AQ5A	
V8	Sync Sep.	6BY6	
V9	Vert. Osc. -Vert. Output	6DN7	
V10	Horiz. Mult.	6CG7	
V11	Horiz. Output	6DQ6A	
V12	Damper	6AX4GT	
V13	HV Rect.	1J3GT	
V14	LV Rect.	5U4GB	

PICTURE TUBE

ITEM No	REPLACEMENT DATA			NOTES
	HOTPOINT PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V15	21DEP4	21DEP4 ①		21DEP4 ②	① "Aluminized" ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA HOTPOINT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	⌀60	350	WT31X168	AFH84-100-20				Q-321.5 MTD-4540	TVL3-461I.2*
B	⌀100	350							
C	⌀40	300							
D	40	75							
C2A	100	6	WT31X167	AFH3-165-90	C0780 BBR100-5			D-340 MTH-0610	TVL3-3602 *
B	⌀30	350							
C	⌀25	25							
C3	4	50	WT31X133	PRS350V4	BBR4-50	TT150X4	TD-4-50	MT-1504	TVA-1402
C4	40	450	WT31X166	PR5450V4	BR4045	TC78	TD-40-450	MT-4540	TVA-1712
C5	4	25NP	WT31X161 ①	ND-PRS50V4	BBR8-150 † BBR8-150 †	TC504	TD-8-150 † TD-8-150 †	MT-1508 † MT-1508 †	TVA5-1202.2*

① Not used in some versions. † Connect negative leads together.
* Not normally in distributors stock. Available through distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA HOTPOINT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	18		WT18X122		TCZ-18		CNO-418	5TCC-QJ88 10% *	NPO 5%
C7	800		WT18X380	BPD-0008	DD-801	L10T8		5GA-T8	
C8	.15	200	WT25X37	P388N-15		CUB2P15	GEM-2015	2TM-P15	
C9	68		WT18X202		DTZ-68		CNO-468	5TCC-QG68 5% *	NPO 5%
C10	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C11	560		WT18X343	DI-560	MD-561		JL-356	5GA-T56B 10% *	10%
C12	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C13	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C14	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C15	51		WT18X354		TCZ-51			5TCC-QG51 5% *	NPO 5%
C16	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C17	470		WT18X382	DI-470	MD-471		JL-347	5GA-T47B 10% *	10%
C18	680		WT18X384	DI-680	MD-681		JL-368	5GA-T68B 10% *	10%
C19	800		WT18X84	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C20	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C21	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C22	800		WT18X385	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C23	3		WT18X171					5TCCB-V3S ± .25mmf	NPO ± .25mmf
C24	5		WT18X101	NPO-DI 5		C10V5C		5TCCB-V5S 10% *	NPO 5%
C25	5000		WT18X86	BPD-006	DD-502	BYA10D5	B-350	5HK-D6	
C26	.1	200	WT25X34	P388N-1		CUB2P1	GEM-301	2TM-P1	
C27	10000		WT18X199	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C28	.047	200	WT25X23	P388N-047		CUB2S47	GEM-4147	2TM-S47	
C29	33		WT18X166		DTZ-33		CNO-433	5TCC-QS3S 5% *	NPO 5%
C30	5000		WT18X390	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C31	10000		WT18X199	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C32	20		WT18X321		DTZ-20			5TCC-Q20S 5% *	NPO 5%
C33	22		WT18X366		DTZ-22		CNO-422	5TCC-Q22S 5% *	NPO 5%
C34	.15	400	WT25X37	P488N-15		CUB4P15	GEM-4015	4TM-P15	
C35	5000		WT18X86	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C36	.047	200	WT25X23	P388N-047		CUB2S47	GEM-4147	2TM-S47	
C37	5000		WT18X388	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C38	5000		WT18X386	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C39	1200		WT18X392				JL-212	5GA-D12S 10% *	10%
C40	5000		WT18X388	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C41	5000		WT18X386	BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C42	120		WT19X34	1469-000L2		22R5T12		MS-312	5%
C43	.015	600	WT26X34					6TM-S15S 10% *	10%
C44	.0082	400	WT25X37				GEM-16282	5BF-D82	10%
C45	.047	400	WT25X36	P488N-047		CUB4S47	GEM-4147	4TM-S47	
C46	10000		WT18X199	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C47	5000	1000	WT18X389	BPD-005	DD5-502	BYA10D5	B-250	5HK-D5	
C48	5000		WT18X98	BPD-005	DD5-502	BYA10D5	B-250	5HK-D5	
C49	1300		WT18X300	DI-1300			JL-212	5GA-D12S 10% *	10%
C50	10000		WT18X199	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C51	47		WT19X353	N750-DI 47	DTN-47	C10Q47U	CNT-447	5TCU-Q47S 10% *	N750 10%
C52	.015	600	WT26X34					6TM-S15S 10% *	10%
C53	.1	600	WT25X34	P668N-1		CUB6P1	GEM-601	6TM-P1	
C54	.033	400	WT25X47				ACE-1033	5BE-S33S 10% *	10%
C55	.1	400	WT25X34	P488N-1		CUB4P1	GEM-401	4TM-P1	
C56	.01	1600		P1668N-01		CUB16S1	GEM-1611	16TM-S1	
C57	.033	1000	WT27X16	P1068N-033			ACE-10333	10TM-S33*	
C58	82		WT18X319		TCZ-82	C10Q82U	CN7-482	5TCU-Q82S 10% *	N750 10%
C59	39		WT18X385		TCZ-39	C10Q39U	CN7-439	5TCU-Q39S *	
C60	750		WT18X313		DI-750		JL-375	5GA-T75S 10%	10%
C61	1300		WT18X387		DI-1300		JL-213	5GA-D13S 10%	10%
C62	5000		WT18X360		DI-5000		JL-250	5GA-D6S 10%	10%
C63	.1	200	WT25X34		P388N-1		CUB2P1	GEM-201	2TM-P1	
C64	.0068	600	WT25X29				CUB6S68	GEM-16368	6TM-D68S 10% *	10%
C65	820		WT19X54		1464-00062		1R5T82	MS-382	5%
C66	.1	400	WT25X34		P488N-1		CUB4P1	GEM-411	4TM-P1	
C67	5000		WT18X390		BPD-006	DD-502	BYA10D6	B-350	5HK-D6	
C68	820		WT18X388					JL-362	5GA-T82S 10%	10%
C69	10000	1000	WT18X299			DD-103		B-110	10HKB-S1	
C70	250	4000	WT16X174							N1500 10%
C71	.006	600	WT25X32					6TM-S56S 10% *	10%

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA HOTPOINT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C72	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C73	10000	1400	WT18X380		DD6-103	CUB16S1	2HV-110	20HKB-S1	
C74	800		WT18X380	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C75	2000		WT18X89	BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C76	800		WT18X84	BPD-0008	DD-801	L10T8	B-210	5GA-T8	
C77	800		WT18X84	BPD-0008	DD-801	L10T8	B-210	5GA-T8	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA HOTPOINT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	WT49X380					Tone
B	1meg	½						Volume, Tap ⑤ 500K
C	Switch							Push Push Type
R2	200K	½	WT49X278					Brightness
R3	17K	½	WT49X262					Contrast, Tap ⑤ 10K
								Stop ⑤ 2000Ω
R4A	300K	½	WT49X279	B-50	A47-250K-S	Q11-130	U46	Vert. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	1meg	½	WT49X235	BX-59	A47-1meg-S	Q11-137	TA16L	Horiz. Hold
B	Shaft			Not Req.	KS6-3	Not Req.	Not Req.	
R6A	3meg	½	WT49X158	BX-84	A47-3meg-S	Q11-140	SU-59	Height
B	Shaft			Not Req.	FS3-1/4	TQ	Not Req.	
R7A	2000Ω	2(WW)	WT49X277					Vert. Linearity
B	Shaft							
R8A	50K	½	WT49X282			R13-123	TA54A	Volume - Remote Unit
B	Shaft					TM-2	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise stated.

ITEM No.	RATING OHMS	RATING WATT	HOTPOINT PART No.	NOTES
R9	33Ω			
R10	5600Ω			
R11	1000Ω			
R12	12K			
R13	47Ω			
R14	10K			
R15	1000Ω			
R16	4.7meg			
R17	12K			
R18	47Ω			
R19	22K			
R20	5600Ω	2		
R21	220Ω			
R22	120Ω			
R23	82K			
R24	270K 5%			
R25	75K 5%			
R26	3300Ω 5%			
R27	3200Ω			
R28	330K			
R29	68Ω			
R30	22K			
R31	180K			
R32	12K			
R33	1.5meg			
R34	2200Ω			
R35	33K			
R36	1.5meg			
R37	68K			
R38	200K 5%			
R39	100K			
R40	2.2meg			
R41	22meg 5%			
R42	5600Ω			
R43	33K	1		
R44	10K	1		
R45	22K			
R46	3meg 5%			Note 1
R47	22Ω			
R48	33K			
R49	120Ω			
R50	470K			

Note 1. Some versions may use 3.3meg in this application.

ITEM No.	RATING OHMS	RATING WATT	HOTPOINT PART No.	NOTES
R51	470K			
R52	680Ω			
R53	470Ω			
R54	2meg 5%			
R55	47K	1		
R56	33K			
R57	33K	1		
R58	18K	1		
R59	330K			
R60	1.5meg			
R61	1meg Cold 600K Hot		WT14X118	
R62	5600Ω 5%			
R63	1.5meg			
R64	1000Ω	1		
R65	1000Ω			
R66	1000Ω			
R67	4700Ω			
R68	470K			
R69	330K			
R70	1meg			
R71	82K			
R72	15K	1		
R73	820K			Note 2
R74	68K			
R75	47K			
R76	33K			
R77	12K			
R78	8200Ω 5%			
R79	820K			
R80	100Ω			
R81	10K	3	WT14X126	
R82	2200Ω			
R83	5100Ω	7	WT14X119	
R84	15000Ω			
R85	3600Ω	5	WT14X130	
R86	3900Ω	10	WT14X129	
R87	470K			
R88	330Ω			
R89	330Ω			
R90	470Ω			

Note 2. Some versions may use 1meg in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA HOTPOINT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	RF Choke	WT36X333					.1 Microhenry
L2	47.25MC Trap	WT36X336					Includes C8
L3	1st Video IF	WT36X300					
L4A	2nd Video IF	WT61X95					Includes C9
B	41.25MC Trap						
L5A	3rd Video IF	WT61X94					Includes C15
B	47.25MC Trap						
L6A	4th Video IF Assy.	WT56X45 (WT36X335)					Includes C33, C34, M4 .22 Microhenry
B	RF Choke						6.6 Microhenries
C	RF Choke						5.6 Microhenries ①
L7	RF Choke	WT36X260	19-1008	BC-565	4609		
L8	Shunt Peaking Coil	WT36X157	19-3180	TV-184	6180	VP-5	180 Microhenries
L9	Series Peaking Coil	WT36X267	19-1015		4631		82 Microhenries
L10	Shunt Peaking Coil	WT36X376	19-3560	TV-206	6148		750 Microhenries
L11	Shunt Peaking Coil	WT36X271	19-3500	TV-203	6139	VP-5	470 Microhenries
L12	Series Peaking Coil	WT36X375					300 Microhenries
L13	Sound Take-off	WT36X355					
L14	Ratio Detector	WT36X47	17-3476		6206-PC		Includes 220Ω resistor and 120mmf cap.
L15	RF Choke	WT36X105	19-1005	BC-566	4612		10 Microhenries ②
L16	RF Choke	WT36X105	19-1005	BC-566	4612		10 Microhenries ②
L17	RF Choke	WT36X260	19-1008	BC-565	4609		5.6 Microhenries ①

① IRC Part #CL4. ② IRC Part #CL-1.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA HOTPOINT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L18	74Ω		WT36X349						

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES	RATINGS INDUCTANCE @ CURRENT (1000 ~)	REPLACEMENT DATA HOTPOINT PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
L19	.270A	53Ω	1.2 Hy.	WT63X52					26C44	C-23X

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L20	Width Choke	WT36X388								

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⑤1.85A	580VCT ⑤.270A	5V ⑤ 3A	WT82X34						
	SEC. 3	SEC. 4	SEC. 5							
	24V ⑤2.5A tap ⑤ 6.3V ⑤8.5A									

TRANSFORMER (REMOTE CONTROL)

ITEM No.	RATING PRI	RATING SEC 1	RATING SEC. 2	REPLACEMENT DATA HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117V ⑤.05A	24V ⑤.00LA		WT64X73	F5527	P2962		P6469	26F68	F-40X

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	Vert. Osc.	WT64X65		A-3004 ①			A-8126 ①	26A02 ①	A-120Z ①
T4	Vert. Output	WT64X66	21807 ②	A-3037	V-312 ③		VO-101 ③		A-119X ③
T5	Yoke-Horiz. (12MH) (110°)-Vert. (40MH)	WT62X37						Y-51 ④	
	Rear Cover & Centering Device	WT42X18							
	Yoke Clamp	WT5X23							
T6	Horiz. Output	WT77X42							

① Bend tabs down into board and connect green and blue to cathode, yellow to C52 and red to ground.
② Cut and tape blanking winding.
③ Drill new mounting hole(s).
④ Connect yoke terminal #5 to terminal #4 of T5, yoke terminal #6 to C71. Mount C71 external and use new yoke clamp.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC	REPLACEMENT DATA HOTPOINT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T7	16K	3-4Ω	WT64X72	Z1002	A-2901	AU-600	A-3823	22S87	S-53X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA HOTPOINT PART No.	QUAM PART No.	NOTES
SP1	9" x 21"	PM	3-4Ω	WT95X25 ①		① Used in Models 21S560, 561 & UHF
SP2	4"	PM	4-5Ω	WT95X23 ①	4A1TZ5	② Used in Models 21S415, 416 & UHF
	4"	PM	3-4Ω	WT95X2 ②		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	HOTPOINT PART No.	REPLACEMENT DATA	
K1	Sound IF Cathode	470mmf, 180Ω	WT34X4		
K2	De-Emphasis & Coupling	1000mmf, 15000mmf, 1200mmf, 22K	WT33X22		
K3	Sync Coupling	470mmf, 470K	WT34X3	Centralab Sprague	RC-485 PRC-3

HOTPOINT MODELS 21S415, 21S416, 21S560, 21S561 & UHF (U3 Line)

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			HOTPOINT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	N	4A 125V S/B	WT10X21	WT38X60	333004 (N-4A-125V-S/B)	346019	N4	HN 3½ to 5
M2	N	4/10A 125V S/B	WT10X22	WT38X61	333.400 (N-4/10A-125V-S/B)	346009	N 4/10	HN 3/10 to 1/2
M3	1" Length of #26 Copper Wire							

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		HOTPOINT PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N87A	WT16X1	1N60	1N295	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	HOTPOINT PART No.	NOTES
M5	Lamp		#44
M6	Tuner	WT86X77	VHF
	Tuner	WT86X78	VHF, with UHF provisions
	Tuner	WT85X24	UHF
M7	Switch	WT39X3	Local-Distance, DPDT (Slide Type)
M8	Switch	WT39X3	Phono-TV, DPDT (Slide Type)
M9	Switch	WT39X5	Width Selector (Rotary Wafer Type)
M10	Relay	WT62X17	
M11	Switch	WT92X200	Detent Assy. (Includes Contact Spring with Silver Contact, Spacer and Bracket with Silver Contact)
M12	Switch	WT5X26	Program Assy. (Includes Contact Springs with Silver Contact and fibre bracket)
M13	Motor Assy.	WT72X3	Includes Gear Box and Muting Switch
M14	Switch		Remote Control On-Off (Pushbutton Type)
M15	Switch		Remote Control Channel Selector (Pushbutton Type)
	Magnet	WT42X31	Beam Alignment (Used only when necessary to improve focus)

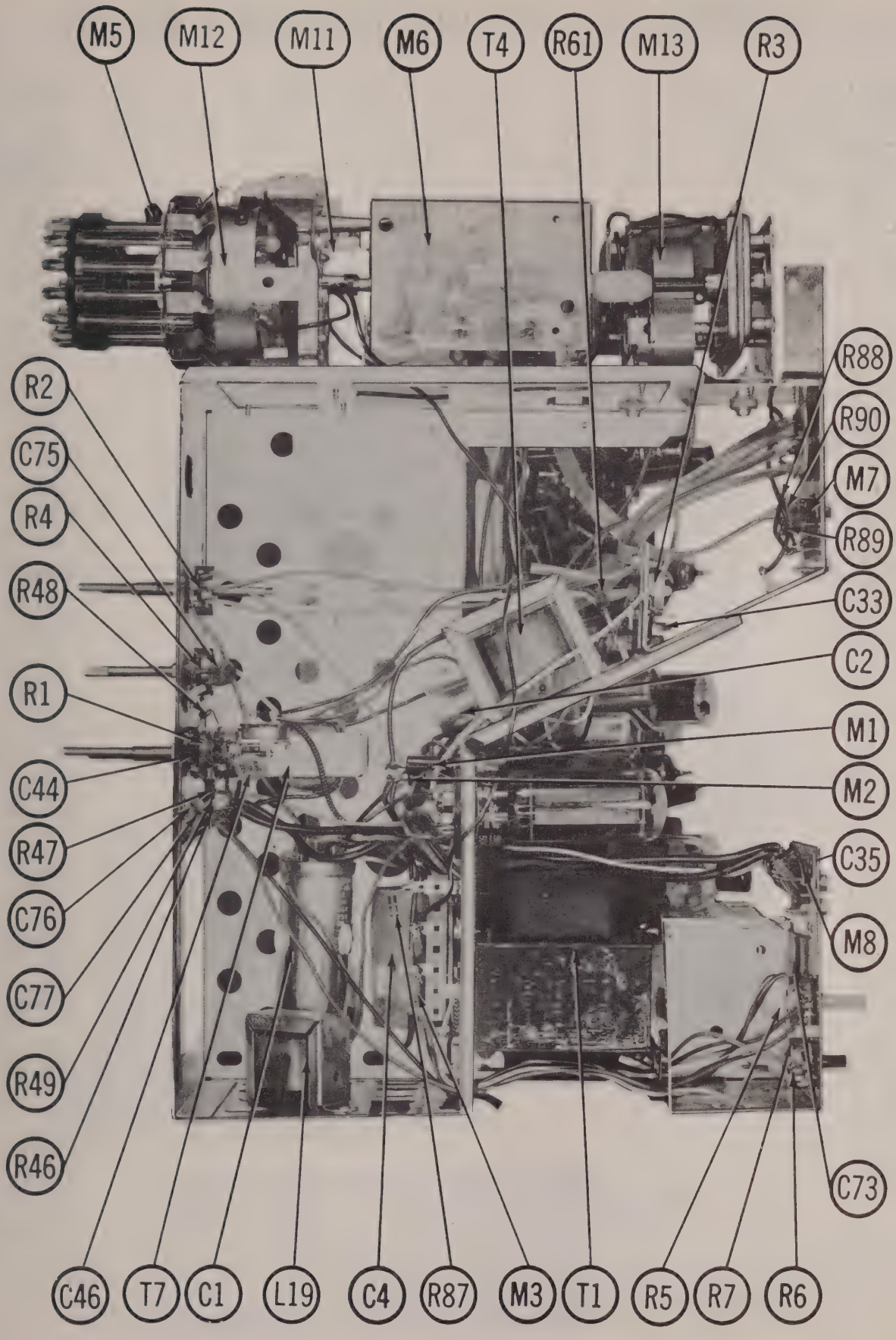
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

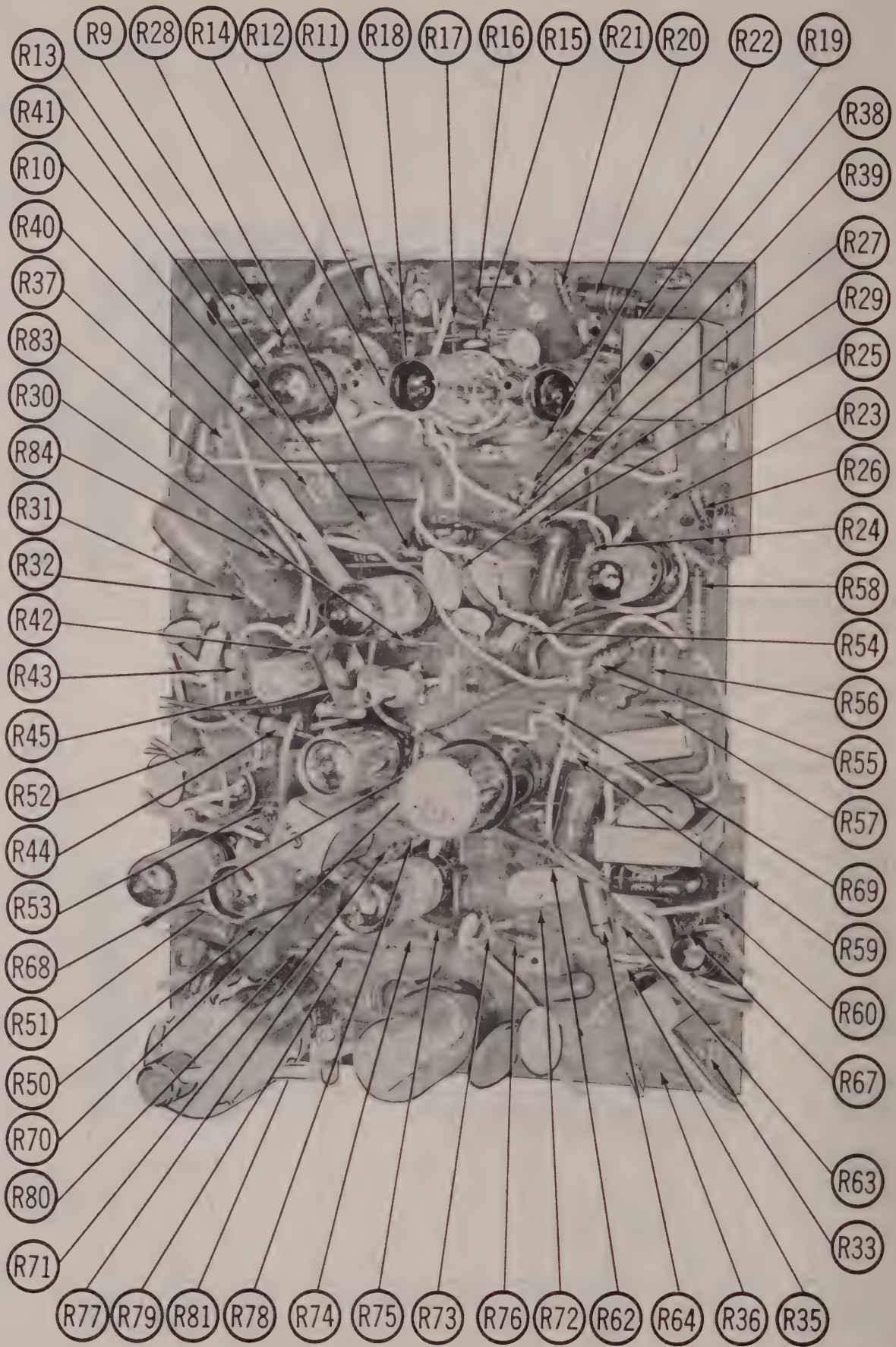
NAME	PART NO.	DESCRIPTION
Safety Glass	WT94X69	
Mask	WT237X9	Models 21S415, 416 & UHF
Mask	WT237X10	Models 21S560, 561 & UHF
Escutcheon	WT233X18	Selector, Models 21S415, 416 & UHF
Escutcheon	WT233X19	Selector, Models 21S560, 561 & UHF
Knob	WT218X61	Channel Selector, Models 21S415, 416 & UHF
Knob	WT218X66	Channel Selector, Models 21S560, 561 & UHF
Knob	WT218X34	Fine Tuning, Models 21S415, 416
Knob	WT218X62	UHF Tuning
UHF Indicator	WT218X27	
Knob	WT218X63	Volume, Contrast, Vertical
Knob	WT43X260	Brightness, Tone
Cabinet	WT245X61	Models 21S415 & UHF
Cabinet	WT245X62	Models 21S416 & UHF
Cabinet	WT245X64	Models 21S560 & UHF
Cabinet	WT245X65	Models 21S560 & UHF
Leg	WT226X25	Models 21S415 & UHF
Leg	WT226X26	Models 21S416 & UHF

WIRING DATA

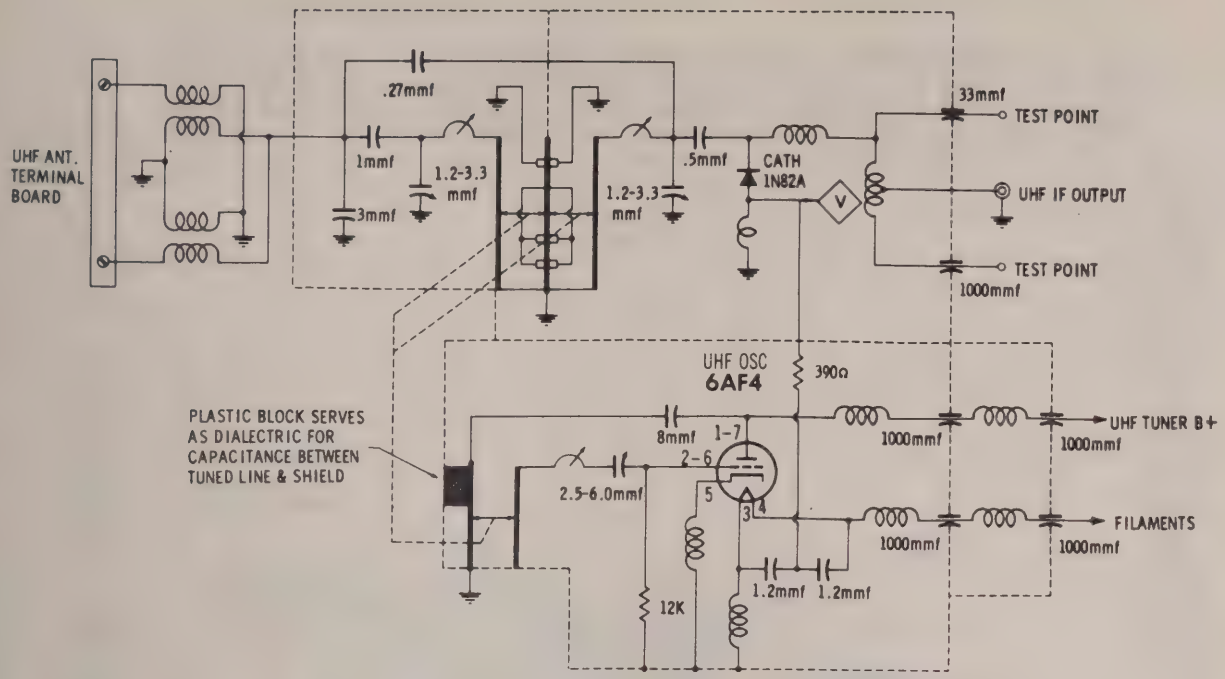
High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor



CHASSIS - SIDE VIEW



PRINTED BOARD - RESISTOR IDENTIFICATION



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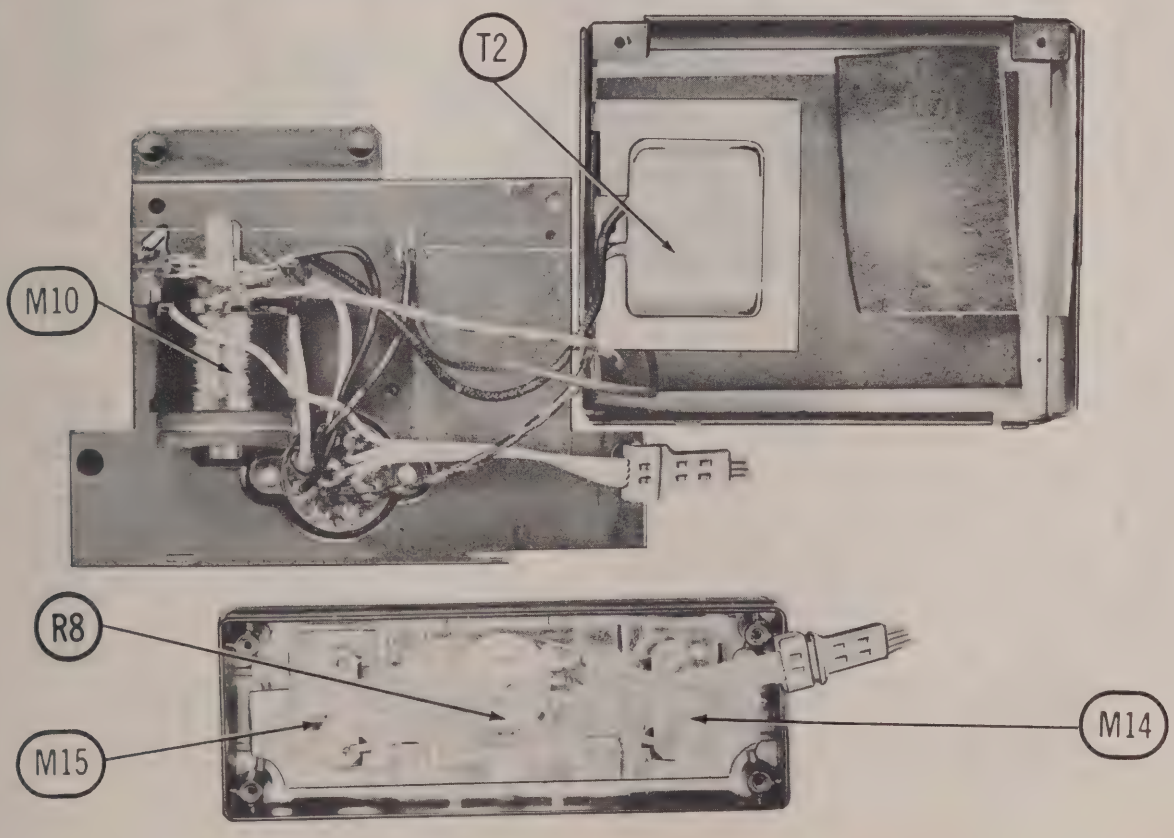
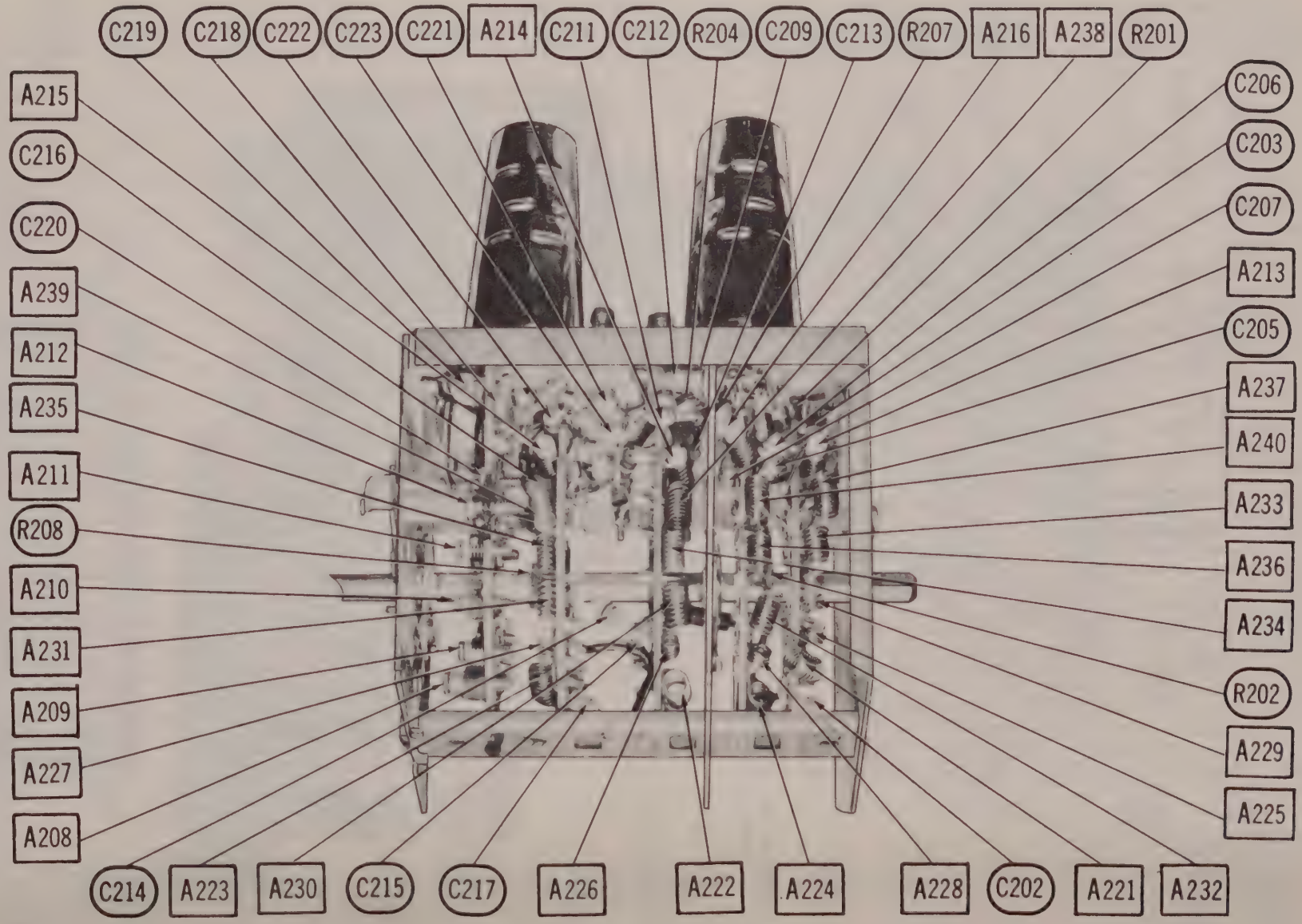
UHF TUNER WT85X24



REMOTE TUNING UNIT



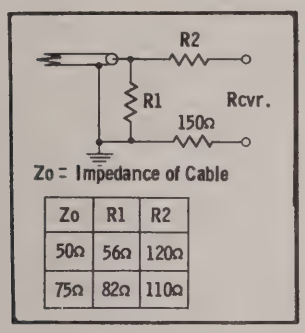
TUNER WT86X77 - RIGHT SIDE

TUNER ALIGNMENT INSTRUCTIONS (cont)

UHF IF ALIGNMENT

Connect bias as under "VHF RF and Mixer Alignment".
Disconnect IF Output and terminate with a 68Ω resistor at the open end.
Remove UHF Mixer Crystal.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to point (V). Low side to chassis.	43.5MC (10MC Swp)	40.5MC 45.75MC	UHF Tune UHF for MINIMUM tilt over center tuning area	Vert. Amp. thru 10K to point (U). Low side to chassis.	A241, A242, A243, A244	Adjust A241 for correct placement of 40.5 MC marker. (See Fig. 205). Adjust A242 and A243 for maximum gain and symmetry. Adjust A244 for maximum gain and zero tilt.



Zo	R1	R2
50Ω	56Ω	120Ω
75Ω	82Ω	110Ω

FIG. 201

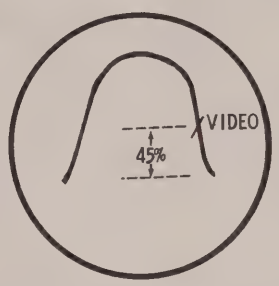


FIG. 202

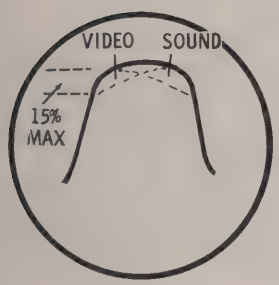


FIG. 203

FIG. 204

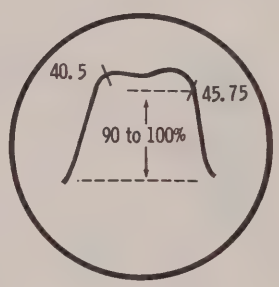
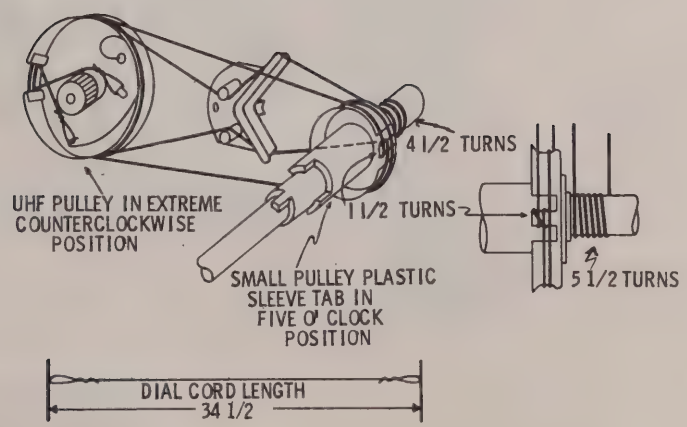
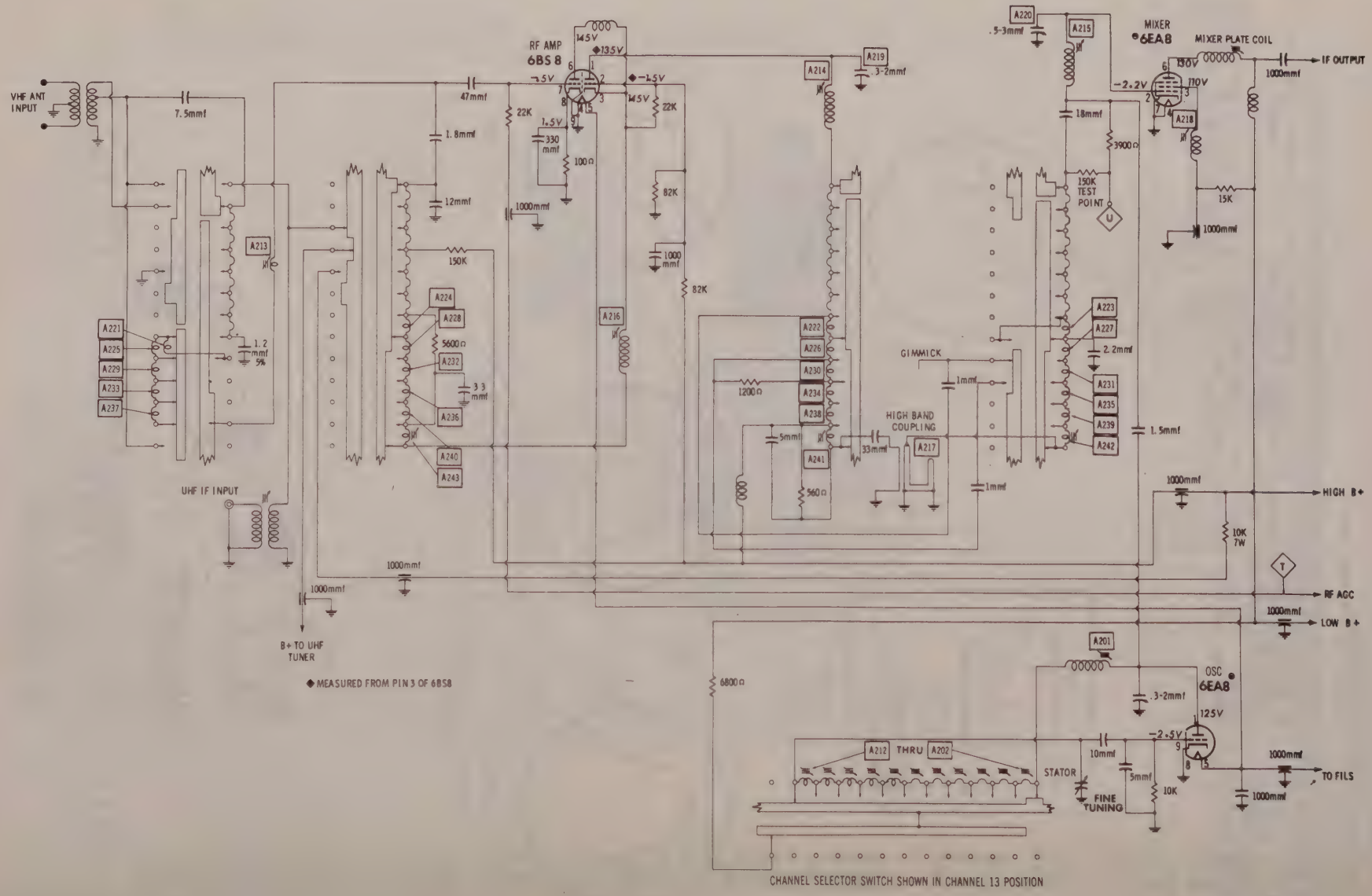


FIG. 205


4 1/2 TURNS
UHF PULLEY IN EXTREME COUNTERCLOCKWISE POSITION
1 1/2 TURNS
5 1/2 TURNS
SMALL PULLEY PLASTIC SLEEVE TAB IN FIVE O' CLOCK POSITION
DIAL CORD LENGTH
34 1/2

UHF DRIVE CORD STRINGING



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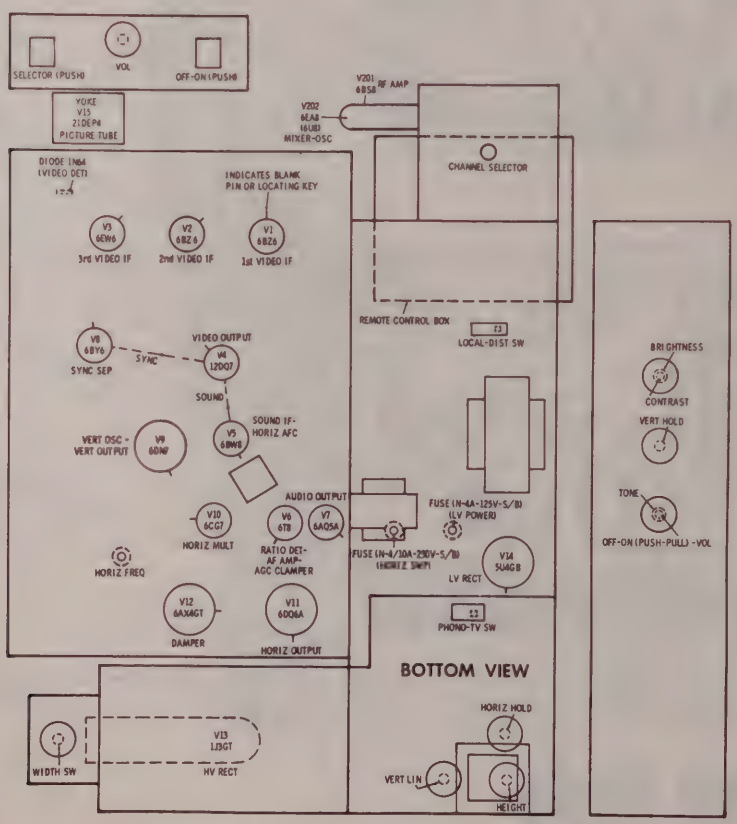
VHF TUNER WITH UHF PROVISIONS WT86X78

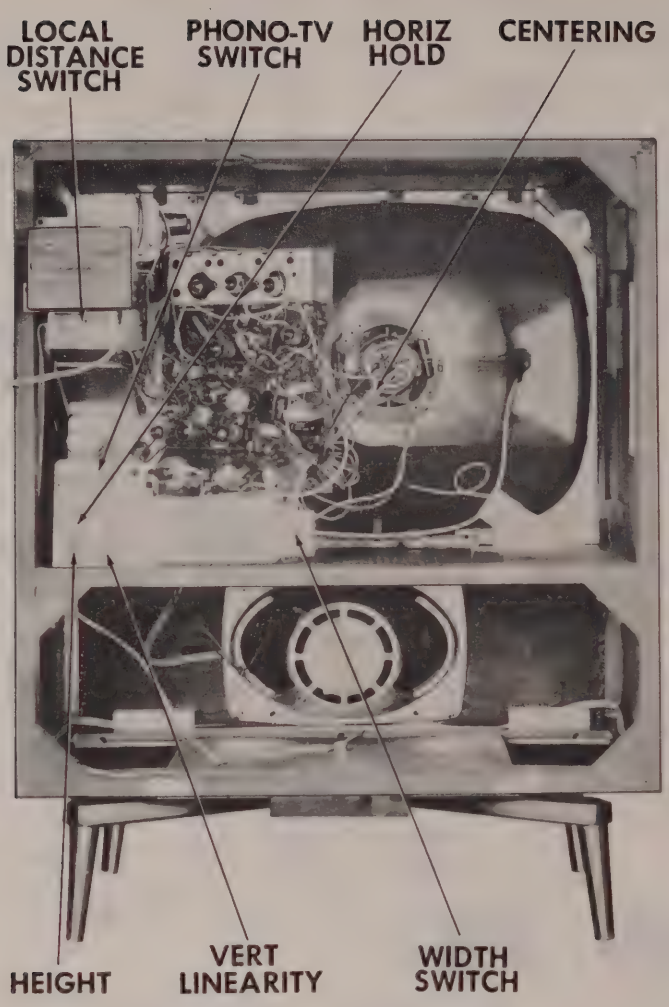
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	455K	47Ω	.1Ω	0Ω	†4600Ω	†16K	0Ω		
V2	6BZ6	460K	47Ω	.1Ω	0Ω	†4600Ω	†16K	0Ω		
V3	6EW6	.1Ω	120Ω	.1Ω	0Ω	†5800Ω	†28K	0Ω		
V4	12DQ7	68Ω	330K	0Ω	.1Ω	.1Ω	0Ω	†4800Ω	†3900Ω	0Ω
V5	6BW8	800K	330K	0Ω	.1Ω	0Ω	2.5Ω	180Ω	†40K	†14K
V6	6T8	INF	22K	INF	0Ω	.1Ω	590K	0Ω	3meg	†470K
V7	6AQ5A	470K	470Ω	0Ω	.1Ω	†1700Ω	†3900Ω	470K		
V8	6BY6	†4.7meg	0Ω	.1Ω	0Ω	†45K	†22K	2.3meg		
V9	6DN7	1.5meg	‡2800Ω	■ 2100Ω	● 550K	● ‡4.5meg	125Ω	0Ω	.1Ω	
V10	6CG7	†15K	1.8meg	820Ω	0Ω	.1Ω	†80K	68K	820Ω	0Ω
V11	6DQ6A	TP	0Ω	TP	†10K	820K	TP	.1Ω	0Ω	TOP CAP ‡34Ω
V12	6AX4GT	TP	NC	¶1meg	NC	†0Ω	TP	0Ω	.1Ω	
V13	1J3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡366Ω
V14	5U4GB	NC	¶	NC	26Ω	NC	24Ω	TP	¶	
V15	21DEP4	.1Ω	35K	‡1.5meg	0Ω	NC	35K	● 230K	0Ω	
V201	6BS8	†0Ω	50K	75K	0Ω	.1Ω	75K	700K	100Ω	0Ω
V202	6EA8	†11K	170K	†14K	0Ω	.1Ω	†3900Ω	0Ω	0Ω	10K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 280V SOURCE.
‡ MEASURED FROM PIN 3 OF V12.
NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Connect a clip lead from point (F) to chassis.

Parallel the Horizontal Frequency coil with a 1000Ω resistor from point (G) to point (H).

Adjust the Horizontal Hold control until the picture appears to float back and forth across the screen.

Remove the 1000Ω resistor and adjust the Horizontal Frequency slug (B1) until the picture again appears to float back and forth across the screen.

Remove the clip lead between point (F) and chassis.

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

MODEL 21PT9095 (Ch. KCS117A)

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

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RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type knobs from the side.
2. Remove 1 metal screw and remove snap on rear cover.
3. Remove picture tube socket, yoke plug, speaker and HV leads.
4. Remove 1 metal screw holding tuner support bracket.
5. Remove 2 bottom chassis bolts.
6. Remove 2 metal screws holding top chassis braces.
7. Remove chassis.

MODEL 21PT9095 (Ch. KCS117A)

TRADE NAME	RCA Victor	MODELS	CHASSIS
		21PT9095, 21T9112, 21T9115, 21T9117	KCS117A
		21PT9095U, 21T9112U, 21T9115U, 21T9117U	KCS117B
MANUFACTURER	Radio Corporation of America, RCA Victor Tele. Div., Camden 8, N.J.		
TYPE SET	Television Receiver		
TUBES	VHF - Eighteen, UHF - Nineteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 200 Watts, 1.75 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 12 adjustment is located at 3 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

SAFETY GLASS REMOVAL

Remove 4 metal screws holding safety glass bezel. Pull bezel forward to remove.

AGC

Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Oscillator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Waveform slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

FUSE DEVICE

A Thermal switch is used for low voltage power supply protection, 3 fuse wires for filament protection and a 9Ω fusible resistor for Horizontal Sweep Circuit protection.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

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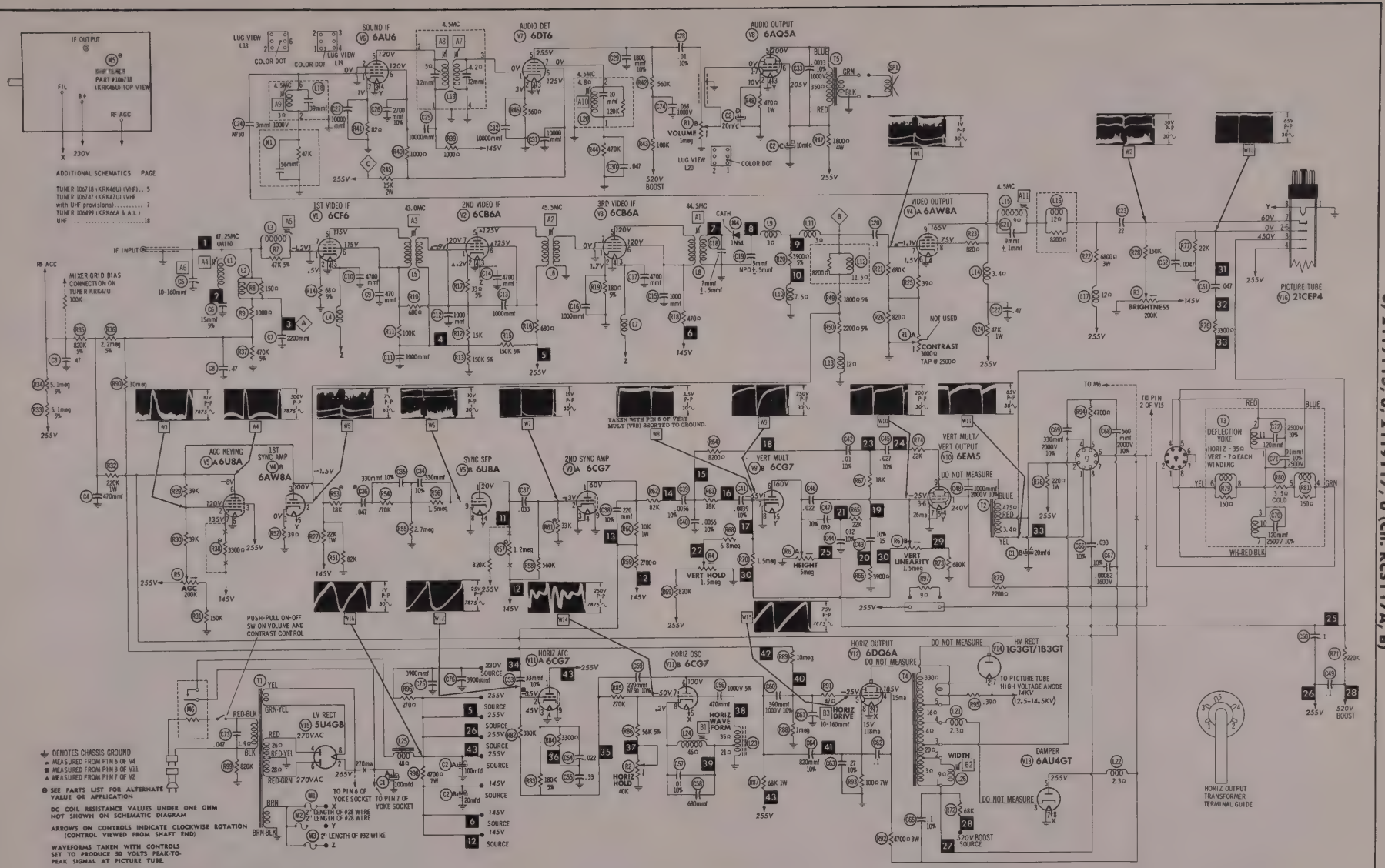
IF OUTPUT
TUNER PART #106718 (KRK46U) TOP VIEW
FIL
B+
RF AGC
230V
ADDITIONAL SCHEMATICS PAGE
TUNER 106718 (KRK46U) (VHF)... 5
TUNER 106747 (KRK47U) (VHF with UHF provisions)... 7
TUNER 106998 (KRK66A & AIL) UHF... 18
SOUND IF V6 6AU6
AUDIO DET V7 6DT6
AUDIO OUTPUT V8 6AQ5A
1ST VIDEO IF V1 6CF6
2ND VIDEO IF V2 6CB6A
3RD VIDEO IF V3 6CB6A
VIDEO OUTPUT V4A 6AW8A
MIXER GRID BIAS CONNECTION ON TUNER KRK47U
AGC KEYING V5A 6U8A
1ST SYNC AMP V4B 6AW8A
SYNC SEP V5B 6U8A
2ND SYNC AMP V9A 6CG7
VERT MULT V9B 6CG7
VERT MULT/VERT OUTPUT V10 6EM5
HORIZ AFC V11A 6CG7
HORIZ OSC V11B 6CG7
HORIZ OUTPUT V12 6DQ6A
HV RECT 1G3GT/1B3GT
LV RECT V15 5U4GB
DAMPER V13 6AU4GT
PICTURE TUBE V16 21CEP4
VOLUME
BRIGHTNESS
CONTRAST
HEIGHT
VERT LINEARITY
VERT HOLD
HORIZ HOLD
HORIZ DRIVE
WIDTH
HORIZ WAVE FORM
PUSH-PULL ON-OFF SW ON VOLUME AND CONTRAST CONTROL
DO NOT MEASURE
NOT USED
TO PICTURE TUBE HIGH VOLTAGE ANODE 14KV (12.5-14.5KV)
HORIZ OUTPUT TRANSFORMER TERMINAL GUIDE
DEFLECTION YOKE
520V BOOST
DENOTES CHASSIS GROUND
MEASURED FROM PIN 6 OF V4
MEASURED FROM PIN 3 OF V11
MEASURED FROM PIN 7 OF V2
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2. Pin numbers are counted in clockwise direction on bottom of socket.
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation; no signal applied

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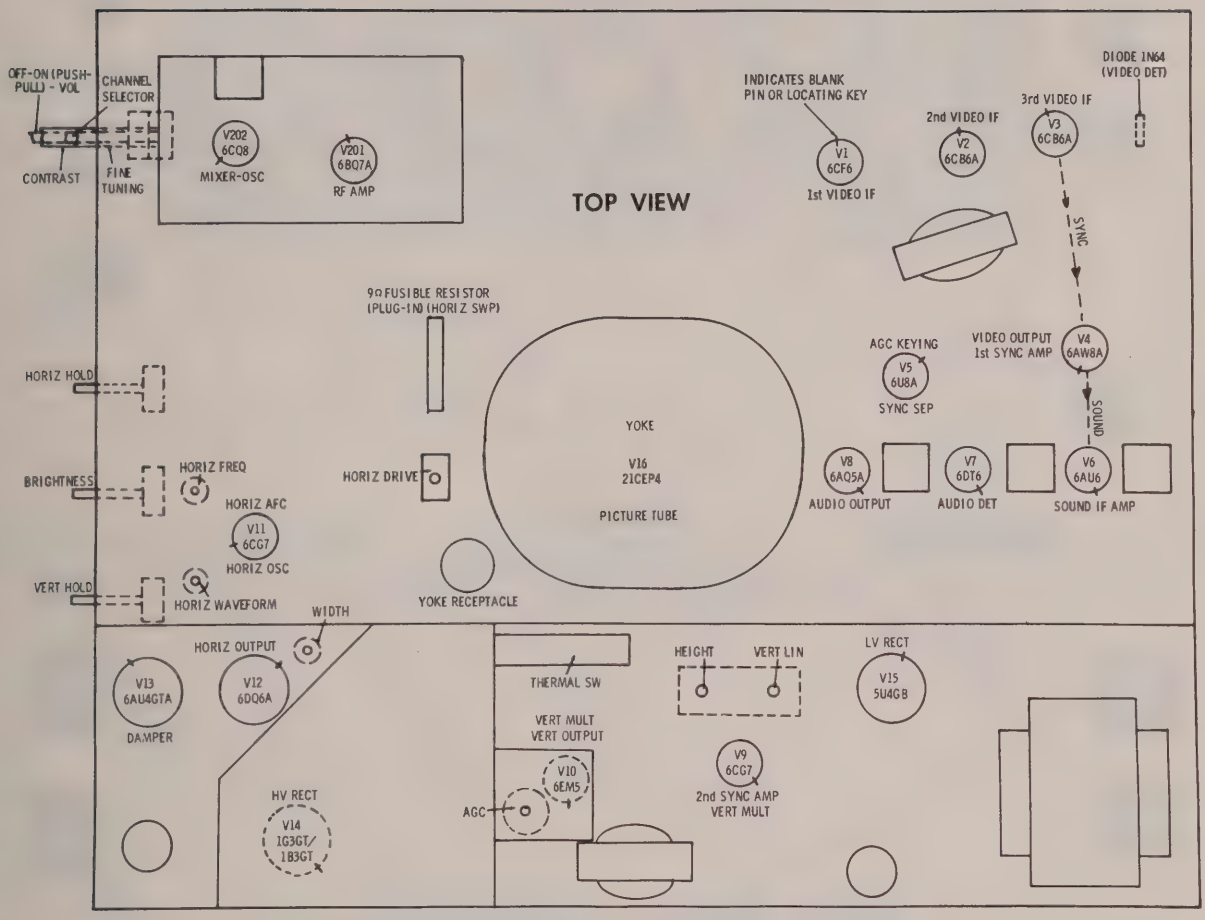
RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

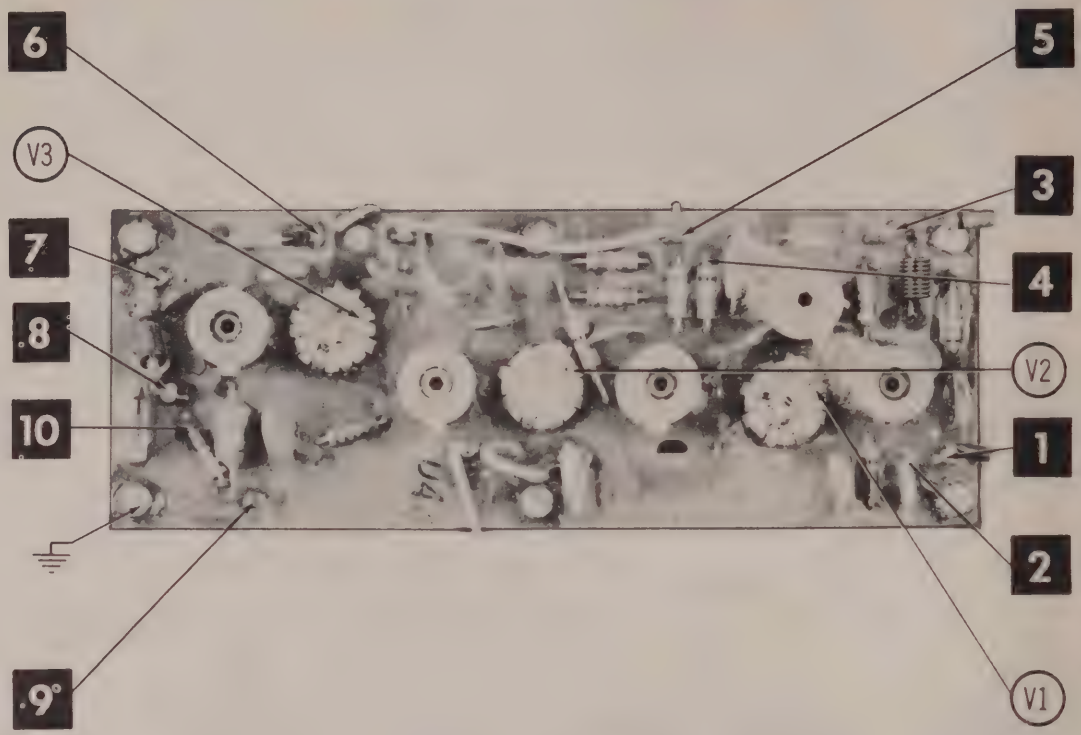
POWER SUPPLY FAILURE
No raster, no sound Thermal Sw (LV Power), Fuse Wires (F1), V15

SWEEP FAILURE
No raster, has sound V11, V12, Fusible Resistor (9Ω), V13, V14, V16
No vertical deflection V9, V10
Poor vert. linearity or foldover V9, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, V15
Vert. off freq. V9, V10
Horiz. off freq. V11

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, Diode (Video Det.) V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V16
Has pic, no sound V6, V7, V8
Overloaded picture V5

SYNC FAILURE
No vert. sync V4, V5, V9
No horiz. sync V4, V5, V9, V11
No vert. or horiz. sync V4, V5, V9

CircuiTrace Numbers 1 thru 10

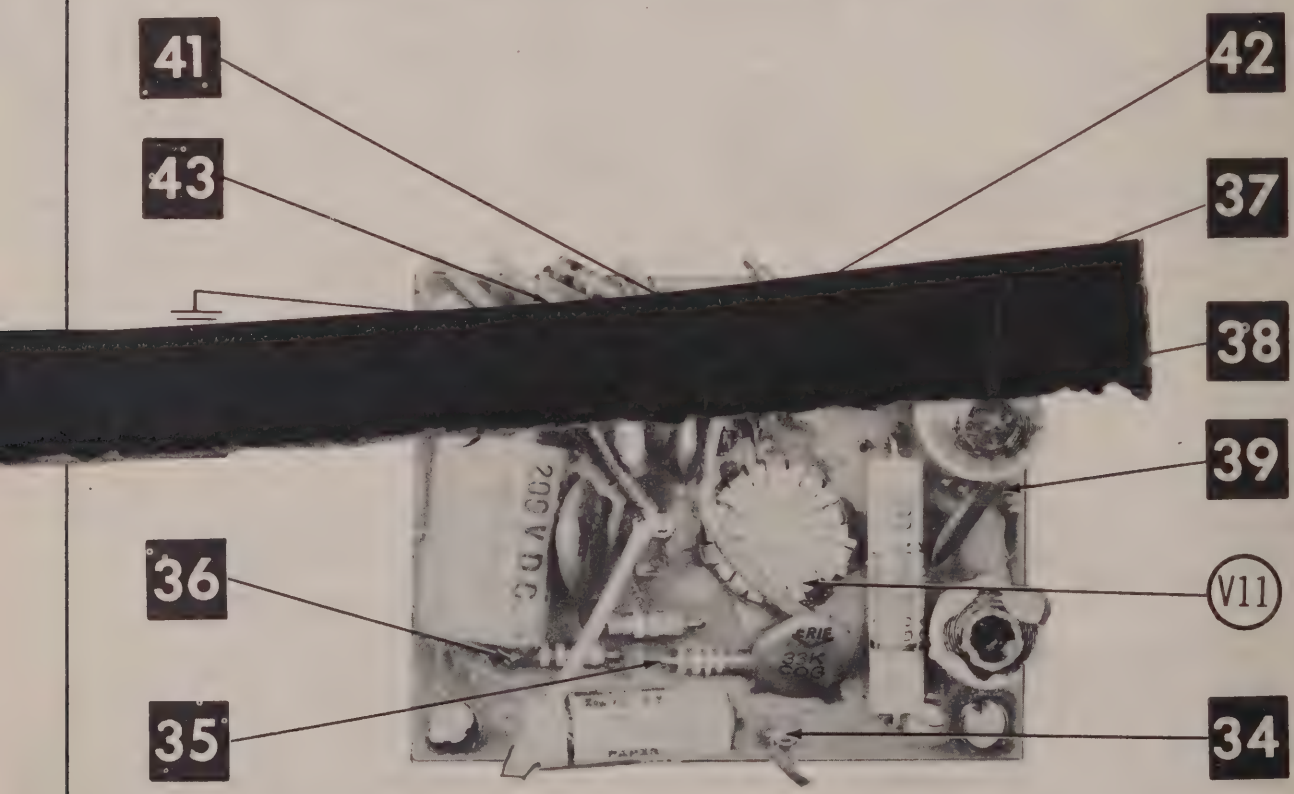


A Howard W. Sams CIRCUITRACE* Photo

VIDEO IF
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

CircuiTrace Numbers 34 thru 43



A Howard W. Sams CIRCUITRACE* Photo

HORIZ PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

VHF TUNER 106718 (KRK46U)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A201 thru A212, A213 thru A216 .... General Cement #5009, 8195, 8274, 8275, 8728, 8987
Walsco #2531
A217 thru A221 ..... General Cement #5000, 5003, 5009, 8290
Walsco #2520, 2523, 2525, 2537

TUNER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (T) . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Unplug IF output cable from the tuner and connect a 39Ω resistor in series with a .001mfd capacitor across IF output socket in tuner.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across antenna terminals thru pad (Fig. 201).	Not used	257MC	13	Vert. Amp. thru diode probe to point (U) . Low side to chassis.	A201	Adjust for zero beat on scope.
2.	"	"	"	251MC	12	"	A202	"
3.	"	"	"	245MC	11	"	A203	"
4.	"	"	"	239MC	10	"	A204	"
5.	"	"	"	233MC	9	"	A205	"
6.	"	"	"	227MC	8	"	A206	"
7.	"	"	"	221MC	7	"	A207	"
8.	"	"	"	129MC	6	"	A208	"
9.	"	"	"	123MC	5	"	A209	"
10.	"	"	"	113MC	4	"	A210	"
11.	"	"	"	107MC	3	"	A211	"
12.	"	"	"	101MC	2	"	A212	"
13.	"	"	183MC	181.25MC 185.75MC	8	"	A213, A214, A215, A216	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown. Adjust A213 for marker position, A214 for proper bandwidth, A215 for proper tilt, and A216 for maximum gain.
14.	"	"	213MC	211.25MC 215.75MC	13	"	A217, A218	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown. Adjust A217 for proper marker positions, A218 for proper tilt and retouch A214 for proper bandwidth.
15.	Repeat steps 13 and 14 for proper tracking and response on all channels from 13 to 7. Repeat step 1. Turn off generators and measure oscillator injection voltage at point (U) with VTVM. The reading obtained should be between -2.5 to -5.5 volts. If outside these limits replace V202 and repeat steps 1 thru 14.							
16.	Repeat step 8.							
17.	Fig. 201	Across antenna terminals thru pad (Fig. 201)	85MC	83.25MC 87.75MC	6	Vert. Amp. thru demodulator probe to point (U) . Low side to chassis.	A219, A220, A221	Adjust for maximum gain and symmetry of response similar to Fig. 202 with markers as shown . Adjust A219 for maximum gain, A220 for proper marker positions and A221 for proper tilt.
18.	"	"	79MC	77.25MC 81.75MC	5	"	A222, A223, A224	If necessary, adjust appropriate coil for response similar to Fig. 202.
19.	"	"	69MC	67.25MC 71.75MC	4	"	A225, A226, A227	"
20.	"	"	63MC	61.25MC 65.75MC	3	"	A228, A229, A230	"
21.	"	"	57MC	55.25MC 59.75MC	2	"	A231, A232, A233	"

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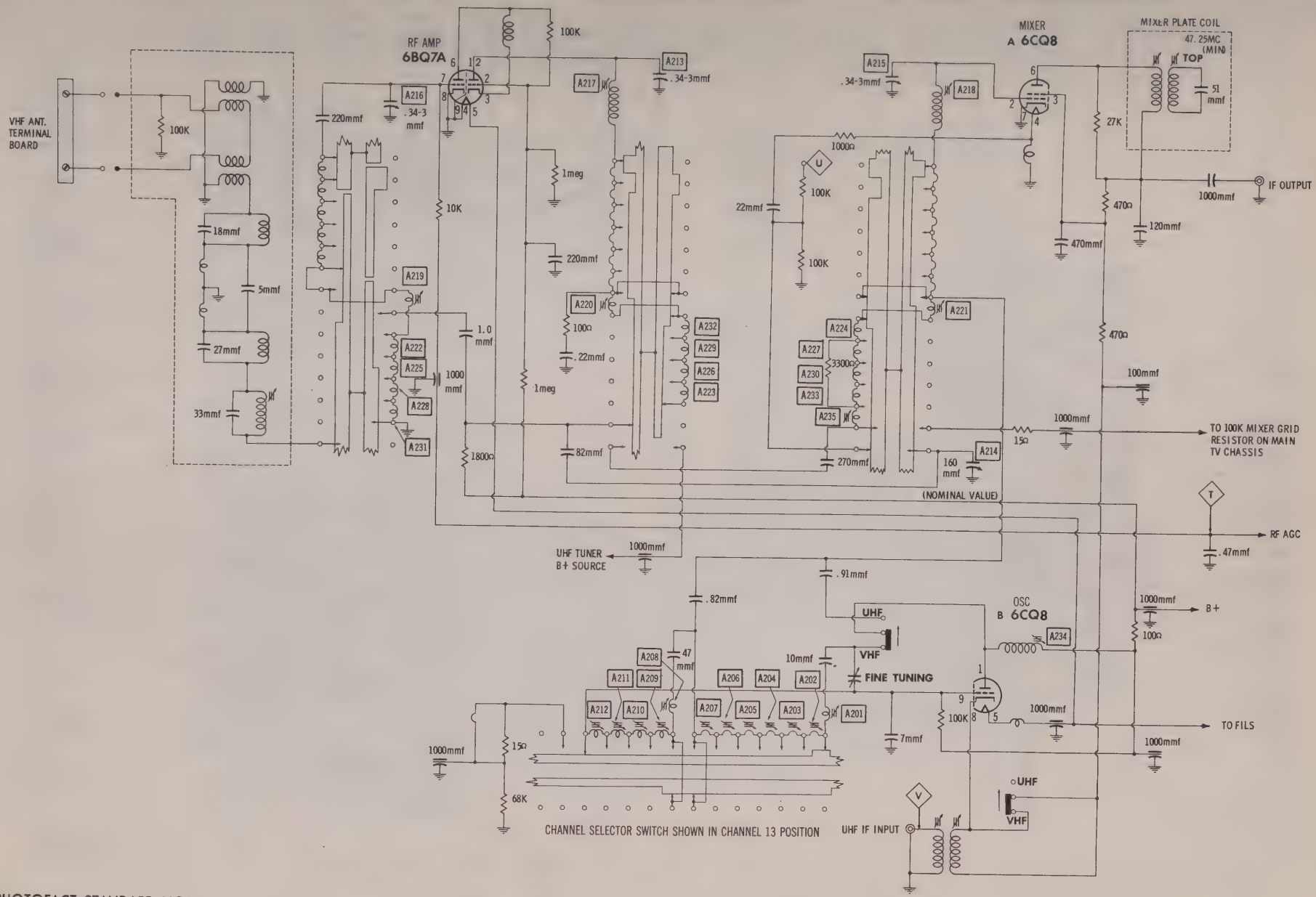

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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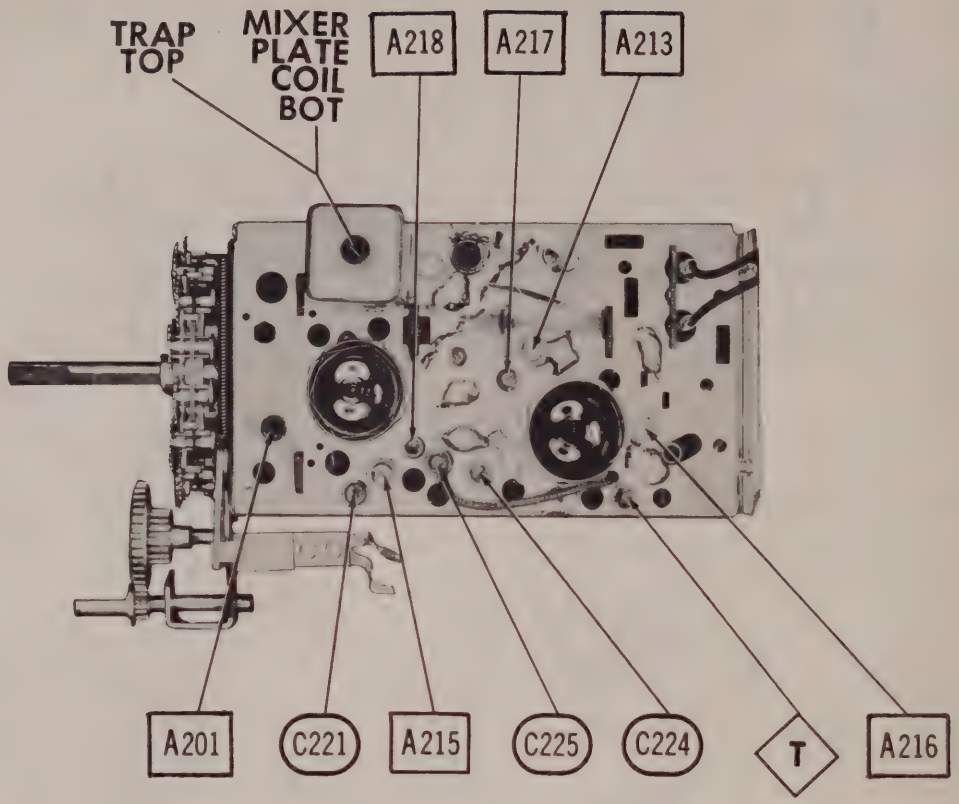
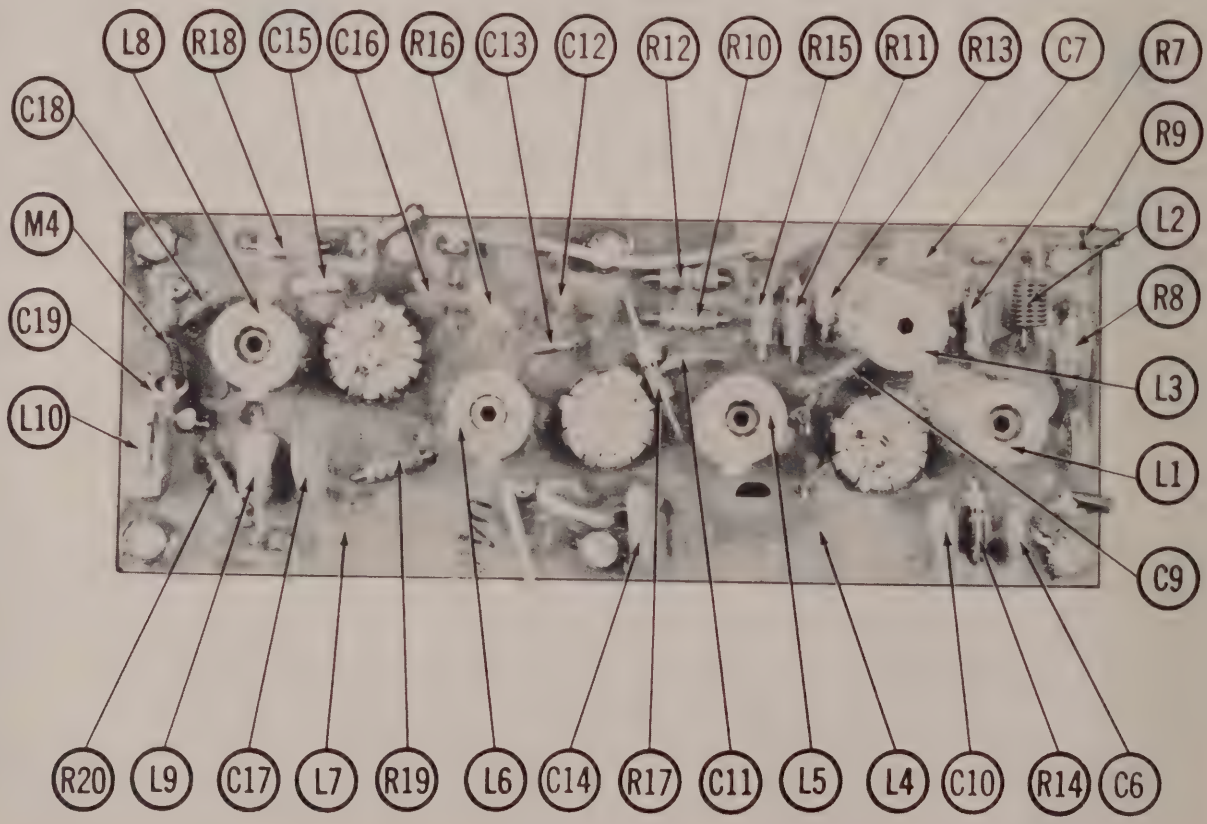
VHF TUNER With UHF Provisions 106747 (KRK47U)

RCA VICTOR MODELS 21PT9095, U, 2119112, U, 2119115, U, 2119117, U (Ch. KCS117A, B)



TUNER TOP VIEW



VIDEO IF PRINTED BOARD

CHASSIS BOTTOM VIEW - RESISTOR, INDUCTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Disable the Horizontal Output circuit by connecting a 150Ω 10W resistor in series with the plate lead of the 6DQ6A (V12). Connect the negative lead of a 12.5 volts bias supply to pin 5 of V12. Connect positive to chassis.

Suggested Alignment Tools:
- A1 thru A5, A7, A8, A9 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295; WALSCO #2526, 2543, 2544, 2545
- A6 ..... GENERAL CEMENT #5004, 5008, 5009; WALSCO #2520
- A10, A11 ..... GENERAL CEMENT #8721, 8722; WALSCO #2519

VIDEO IF ALIGNMENT

Connect the negative lead of a 4 volt bias supply to point Ⓐ. Positive to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	1500mmf Ceramic Capacitor	High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	44.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓑ. Common to chassis. (Across Video Det. load)	A1	Adjust for maximum deflection. Adjust generator output for 3 volts on meter when finally peaked.
2.	"	"	45.5MC	"	"	A2	"
3.	"	"	43.0MC	"	"	A3	"
4.	"	"	47.25MC	"	"	A4, & Mixer Plate Coil	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment".
Connect a 180Ω resistor from pin 5 (plate) to pin 6 (screen) of the 1st Video IF Amplifier (V1).
Couple signal generator loosely to sweep output cable to provide markers.

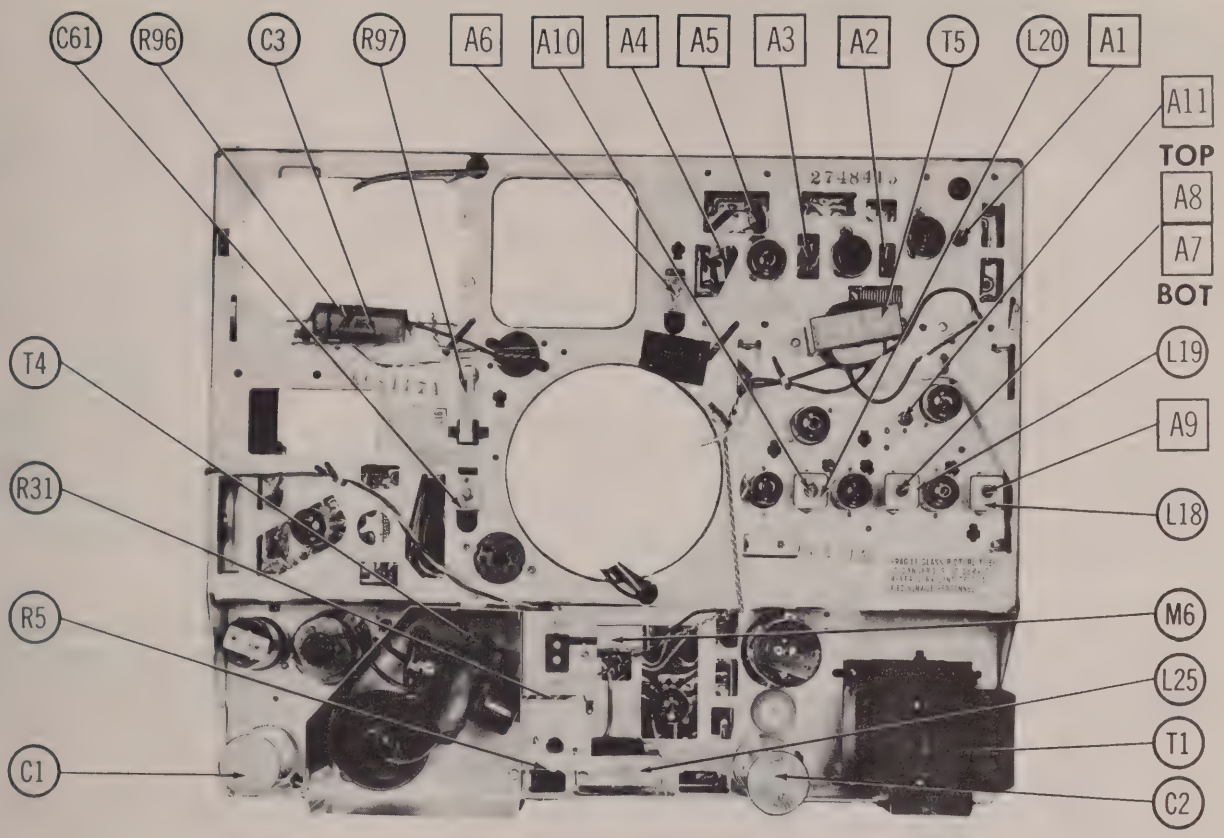
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	1500mmf Ceramic Capacitor	High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	45MC (10MC Swp)	42.5MC 45.75MC	4	Vert. Amp. thru demodulator probe to pin 5 (plate) of 1st Video IF Amp. (V1). Low side to chassis. Calibrate scope for 0.5 volts peak to peak.	A5, A6, & Mixer Plate Coil (Bottom core)	Adjust Mixer Plate Coil (Bottom core) and A5 for maximum gain, using A6 to obtain curve shape with markers as shown in Fig. 1. Remove 180Ω resistor from V1.
6.	"	"	"	42.5MC 45.0MC 45.75MC	"	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. (Across Video Det. load). Calibrate scope for 5 volts peak to peak.	A1, A2, A3	Check for response similar to Fig. 2. If necessary, retouch A1, A2 and A3 for desired response.
7.	Fig. 3	High side thru pad (Fig. 3) to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	Not used	45.75MC	"	USE VTVM DC probe to point Ⓑ. Common to chassis.		Adjust generator output to provide exactly 1.5 volts on VTVM.
8.	1500mmf Ceramic Capacitor	Remove pad. High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	45MC (10MC Swp)	41.25MC		USE VTVM. DC probe to point Ⓑ. Common to chassis. Connect scope as in step 6.	A1, A3	Retouch for 1.0 to 1.5 volts on VTVM while maintaining response similar to Fig. 2.
9.	Fig. 6	Across antenna terminals thru matching network (Fig. 4).	Each VHF Channel in turn	42.5MC 45.75MC 47.25MC	All VHF Channels	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis.	A1, A2	Check for response similar to Fig. 2. Retouch A1 and A2 SLIGHTLY to correct for tilt or other condition that is approximately the same on all channels.

SOUND IF ALIGNMENT

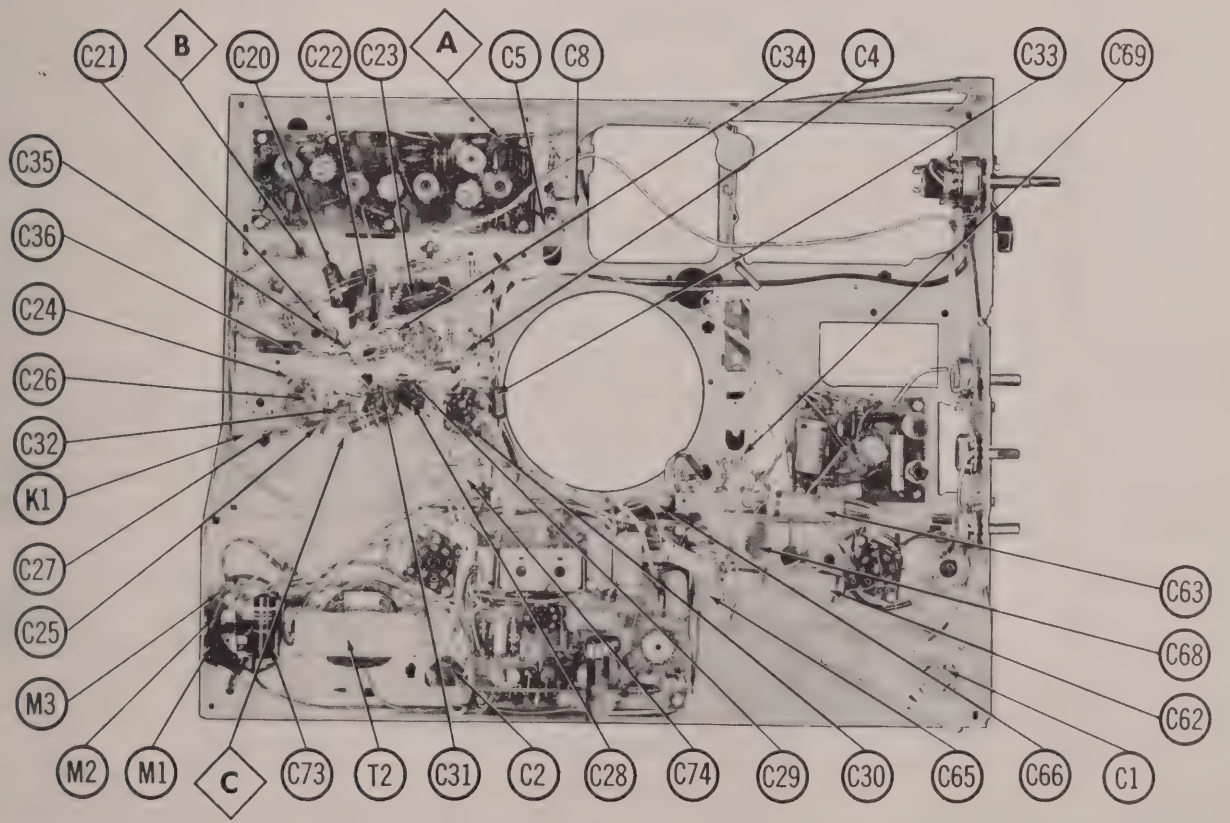
Connect the negative lead of a 10 volt bias supply to point Ⓐ. Positive to chassis.
Set Contrast fully clockwise.
Set VTVM for negative voltage readings.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru diode probe (Fig. 5) to pin 7 (grid 3) of 6DT6 (V7). Common to chassis.	A7, A8, A9	Adjust for maximum negative DC on meter. Attenuate generator for a reading between 1.0 and 1.5 volts on meter when finally peaked. Peak A7 and A8 with maximum core separation. Adjust A9 for maximum deflection.
11.	Remove VTVM and diode probe. Connect scope across Volume control. Turn off signal generator and tune in the strongest signal in the area adjusting Volume control for normal volume. Preset coil slug (A10) flush with top of coil form. While observing scope and listening to sound output adjust A10 clockwise to a peak. Continue turning clockwise to a second louder peak and adjust for maximum on this second peak.						

(continued) PAGE 15



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	6CF6	
V2	2nd Video IF Amp.	6CB6A	
V3	3rd Video IF Amp.	6CB6A	
V4	Video Output - 1st Sync Amp.	6AW8A	
V5	AGC Keying - Sync Sep.	6U8A	
V6	Sound IF Amp.	6AU6	
V7	Audio Det	6DT6	
V8	Audio Output	6AQ5A	
V9	2nd Sync Amp. - Vert. Mult.	6CG7	
V10	Vert. Mult.-Vert. Output	6FM5	
V11	Horiz. AFC - Horiz. Osc.	6CG7	
V12	Horiz. Output	6DQ6A	
V13	Damper	6AU4GTA	
V14	HV Rectifier	1G3GT/ 1B3GT	
V15	LV Rectifier	5U4GB	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	RCA Victor PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No.	
V16	21CEP4		21CEP4 ①	21CEP4 ②	① "Silverama" ③ ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No	SPRAGUE PART No
C1A	100	400	104091	AFH3-100-50	B0726	FP256	TMD-91	D-196	TVL-2813
B	20	400							
C2A	100	400	102411	AFH4-103-40	D0805	FP421.2		Q-348	TVL8-4866.2 *
B	20	350							
C	10	400							
D	20	50							

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.47	200	73787	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C4	470		106546	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C5	10-160		800849						
C6	15		103814		D6-150	82R5Q15	CNO-415	5TCC-Q15S 5% *	5%
C7	2200		77953	BPD-0022	DD-221	BYA10D22	B-222	5SK-D22	
C8	.47	200	73787	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C9	470		76622	BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C10	4700		73473	BPD-0047	DD-472	BYA10D47	B-347	5SK-D47	
C11	1000		77252	BPD-001	DD-102	BYA10D1M	B-210	5SK-Di	
C12	1000		77252	BPD-001	DD-102	BYA10D1M	B-210	5SK-Di	
C13	1000		102334-A	BPD-001	DD-103	BYA10D1M	B-210	5SK-Di	
C14	4700		73743	BPD-0047	DD-472	BYA10D47	B-247	5SK-D47	
C15	1000		102334-A	BPD-001	DD-102	BYA10D1M	B-210	5SK-Di	
C16	1000		77252	BPD-001	DD-102	BYA10D1M	B-210	5SK-Di	
C17	4700		73473	BPD-0047	DD-472	BYA10D47	B-347	5SK-D47	
C18	7		104177					5TCCB-V7S ± .5mmf	± .5mmf
C19	5		104178					5TCCB-V5S ± .5mmf *	NPO ± .5mmf
C20	.1	200	106374	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C21	9		77108					5TCCB-V9S ± 1mmf	± 1mmf
C22	.47	200	104611	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C23	.22	600	106818	P688N-22		CUB6P22	GEM-6022	6TM-P22	
C24	3	1000	102415						NT50
C25	10000		73960	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C26	2700		104121	DK-2700		BYA10D27		5GA-D27S 10% *	10%
C27	10000		73960	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C28	.01	600	106077				GEM-1611	6TM-S1S 10% *	10%
C29	1800		105534	DK-1800		L10D18	JL-218	5GA-D18S 10% *	10%
C30	.047	600	106107	P688N-047	DD-503	CUB6S47	GEM-6147	6TM-S47	
C31	10000		73960	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C32	10000		73960	BPD-01	DD-103	BYA10S1	B-110	5SK-S1	
C33	.0033	1000	106078				GEM-16233	10TM-D33S 10% *	10%
C34	330		105301	DK-330	D6-331	L10T33	JL-333	5GA-T33 10% *	10%
C35	330		105301	DK-330	D6-331	L10T33	JL-333	5GA-T33 10% *	10%
C36	.047	400	106110	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	①
C37	.033	400	105318	P488N-033		CUB4S33	GEM-4133	6TM-S33	
C38	220		73936	1469-00022	D6-221	22R5T22		MS-322	10%
C39	.0056	600	104906				GEM-16256	6TM-D56S 10% *	10%
C40	.0056	600	104906				GEM-16256	6TM-D56S 10% *	10%
C41	.0039	600	76321					6TM-D39S 10% *	10%
C42	.01	200	101000-A			1DR5S	GEM-1611	2WF-S1	10%
C43	.15	200	104908				GEM-2015	2WF-P15	10%
C44	.012	400	103195					5BF-S12	10%
C45	.027	600	75345					6TM-S27S 10% *	10%
C46	.022	600	104145	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C47	.039	400	104907				GEM-4139	5BF-S39	
C48	1000	2000	104222					20GA-D1S 10% *	10%
C49	.1	400	106764	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C50	.1	400	106764	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C51	.047	400	105240	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C52	.0047	400		P488N-0047	DD-472	CUB4D47	GEM-4247	4TM-D47	
C53	33		105348		DD-330	L10Q33	CNO-433	5GA-Q33S 10% *	10%
C54	.022	200	105670	P288N-022	DD-203	CUB2S22	GEM-2122	2TM-S22	
C55	.33	200	105671	P288N-33		CUB6P33	GEM-2033	2TM-P33	
C56	470	1000	105672					MS-347	5%
C57	.01	400	106676				GEM-1611	5BF-S1	10%
C58	680		105518	BPD-00068	DD-681	BYA10T68	B-368	5GA-T68	
C59	220		105345	N750-DI 220	DTN-220	CTA5T22U	CWT-322	5TCU-T22S 10%*	NT50 10%
C60	330	1000	105675		D6-331	L10T33		10GA-T33S 10%*	10%
C61	10-160		800849						
C62	.1	600	73557	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C63	.27	200	73786				GEM-6027	2WF-P27	10%
C64	330		106060	1469-00062		1R5T33		MS-332	10%
C65	.1	600	73557					6TM-P1S 10% *	10%
C66	.033	400	73552					5BF-S33	10%
C67	.00082	1600	106759					MS-T82S 10% *	10%
C68	560	2000	106307						10%
C69	330	2000	102177					30GA-T33S 10%*	10%
C70	120	2500	103536					30GA-T12S 10% *	10%

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No	
C71	91	2500	103535					30GA-Q9lS 10% *	10%
C72	120	2500	103536					30GA-T12S 10% *	10%
C73	.047	600	73592	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C74	.068	1000	[illegible]	P1088N-068		CUB1D68	GEM-10168	10TM-S68	
C75	3900		105479	BPD-0039	DD-392	L10D39	JL-239	5GA-D39	
C76	3900		105479	BPD-0039	DD-392	L10D39	JL-239	5GA-D39	

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
① Some versions may use .1mfd ② 400V in this application (Part #106110).

CONTROLS

ITEM No	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3000Ω	1/2	106070					Contrast
B	1meg	1/2						Volume
C	Switch							Push-Pull
R2	40K	1/2	106071					Horiz. Hold
R3A	200K	1/2	106068	B-46	A47-200K-S	Q11-129	U43	Brightness
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	1.5meg	1/2	106069	B-743	A47-1.5meg -S	Q11-138	U155	Vert. Hold
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R5A	200K	1/2	106758	BX-46	B47-200K-S	B11-129	U43	AGC
B	Shaft			Not Req.	Not Req.	TM-2	Not Req.	
R6A	5meg	1/2	104905					Height
B	1.5meg	1/2						Vert. Linearity

† "STA-LOC" Equivalent: FA33T2851, RUP16A, OP1062.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R7	47K 5%			
R8	150Ω			
R9	1000Ω			
R10	680Ω			
R11	100K			
R12	15K			
R13	150K 5%			
R14	68Ω 5%			
R15	150K 5%			
R16	680Ω			
R17	33Ω 5%			
R18	470Ω			
R19	180Ω 5%			
R20	3900Ω 5%			
R21	680K			
R22	6800Ω	3	105662	
R23	820Ω			
R24	47 K	1		
R25	39Ω			
R26	820Ω			
R27	22K	1		
R28	150K			
R29	39K			
R30	39K			
R31	150K			
R32	220K	1		
R33	5.1meg 5%			
R34	5.1meg 5%			
R35	820K 5%			
R36	2.2meg 5%			
R37	470K 5%			
R38	3300Ω			Note 1
R39	1000Ω			
R40	1000Ω			
R41	82Ω			
R42	560K			
R43	100K			
R44	470K			
R45	15K	2		
R46	560Ω			
R47	1800Ω	4	104634	
R48	470Ω	1		
R49	1800Ω 5%			
R50	2200Ω 5%			
R51	82K			
R52	39Ω			
R53	18K			Note 2

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R54	270K			
R55	2.7meg			
R56	1.5meg			
R57	1.2meg			Note 1
R58	560K			
R59	3700Ω			
R60	10K	1		
R61	33K			Note 3
R62	82K			
R63	18K			
R64	5200Ω			
R65	22K			
R66	3900Ω			
R67	18K			
R68	6.8meg			
R69	820K			
R70	1.5meg			
R71	220K			
R72	68K			
R73	680K			
R74	22K			
R75	2200Ω			
R76	3300Ω			
R77	22K			
R78	220Ω	1		
R79	150Ω			
R80	3.5Ω Cold			
R81	180Ω			
R82	330K			
R83	180K 5%			
R84	3300Ω			
R85	270K			
R86	56K 5%			
R87	68K	1		
R88	1meg			
R89	10meg			
R90	10meg			
R91	47Ω			
R92	4700Ω	3	104835	
R93	100Ω	7	104188	
R94	4700Ω			
R95	.39Ω		104181	
R96	270Ω			
R97	9Ω		104295	
R98	4700Ω	7	106074	
R99	820K			

Note 1. Not used in some versions.
Note 2. Some versions may use a 22K in this application.
Note 3. Some versions may use a 56K in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		RCA Victor PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	
L1	47.25MC Trap	104141					
L2	RF Choke						
L3	1st Video IF	104140					
L4	Fil. Choke						
L5	2nd Video IF	104139					
L6	3rd Video IF	104139					
L7	Fil. Choke						
L8	4th Video IF	104139					
L9	RF Choke	102839	19-1006	TV-192	6152		18 Microhenries
L10	Shunt Peaking Coil	104229	19-3125	TV-195	6153	VP-4	120 Microhenries
L11	RF Choke	102839	19-1006	TV-192	6152		18 Microhenries
L12	Shunt Peaking Coil	105311	19-3250 *	TV-185 *	6181 *	VP-5 *	250 Microhenries, wound on 8200Ω resistor
L13	Shunt Peaking Coil	100362	19-3500	TV-203	6174	VP-8	510 Microhenries

COILS (cont)

ITEM No	USE	REPLACEMENT DATA					NOTES
		RCA Victor PART No	Meissner PART No	Merit PART No	Miller PART No	Ram PART No	
L14	Shunt Peaking Coil	106377	19-3080	TV-193	6110		62 Microhenries
L15	4.5MC Trap	79157	17-3402 ▲		1470 ▲		
L16	Series Peaking Coil	106758	19-3300 *	TV-199 *	6155 *		300 Microhenries, wound on 6200Ω resistor
L17	Shunt Peaking Coil	100362	19-3500	TV-203	6174	VP-8	510 Microhenries
L18	1st Sound IF	106858					
L19	2nd Sound IF	106859					
L20	Quadrature Coil	106860					
L21	RF Choke	76510					4.7 Microhenries ①
L22	RF Choke	76510					4.7 Microhenries ①

▲ Disregard tap. * Parallel with 8200Ω resistor. ① IRC Part #CL-1.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI	SEC.	RCA Victor PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No	
L23	76Ω		105667						Horiz. Freq. tapped ② 21Ω Horiz. Waveform
L24	45Ω		102195						

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES	INDUCTANCE @ CURRENT 1000 ~	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No	Thordarson PART No	Triad PART No
L25	.270A	48Ω	.9 Hy.	100286					26C44 ①	C-24X

① Drill new mounting hole.

COILS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA								
		RCA Victor PART No.	Halldorson PART No	Merit PART No.	Miller PART No.	Ram PART No	Rogers PART No.	Stancor PART No	Thordarson PART No	Triad PART No
L26	Width Coil (1.6 - 12MH)	105522		MWC-6	6322	201R15	QRC109	WC-8	WC-22	WLC-12 ①

① Do not use tap.

TRANSFORMER (POWER)

ITEM No	RATING			REPLACEMENT DATA						
	PRI	SEC. 1	SEC. 2	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No	Triad PART No
T1	117V &1.75A	520VCT &.270A	5V &3A	106063		P-2872 ①		P-8172 ①	26R47 ①	R-69BC ①
	SEC. 3	SEC. 4	SEC. 5							
	6.3V &9A									

① Fabricate mounting.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA								
		RCA Victor PART No	Halldorson PART No	Merit PART No	Ram PART No.	Rogers PART No	Stancor PART No.	Thordarson PART No	Triad PART No
T2	Vert. Output	104877			V318				A-115X
T3	Yoke-Horiz. (18MH)	105632 ①		MDF-113	Y-110		DY-26A	Y-47	Y-60-2
	110°-Vert. (12MH)			②③	④		②③	③	
	Rear Cover & Centering Device	104460							YC-110
	Yoke Clamp	104409							
T4	Horiz. Output	106063						FLY-150 *	D-139 * ③

① Includes C70, C71, C72, R78, R80 and R81.
② Use original rear cover and centering device.
③ Use original yoke damping network, if necessary.
④ Drill new mounting hole(s).

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	5						5	5
	4						4	4
	3						3	3
	2						2	2
	1						1	1
Connect Width Coil Across		2 & 1					2 & 1	2 & 1

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	
T5	7800Ω	4-8Ω	100037	21003	A-3020	AU-804	A-3849	26S48	S-9Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP	RCA Victor PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	104661	5A07R	

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RCA Victor PART No.	REPLACEMENT DATA
K1	Sound IF Grid	56mmf, 47K	104329	Centralab RC-421 Sprague PRC-1

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RCA Victor PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	2" Length of #28 Wire							
M2	2" Length of #28 Wire							
M3	2" Length of #32 Wire							

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		RCA Victor PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N64		1N64	1N295	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M5	Tuner	106718	VHF (KRK46U) Ch. KCS117A
	Tuner	106747	VHF With UHF Provisions (KRK47U) Ch. KCS117B
	Tuner	106499	UHF (KRK56A) Ch. KCS117B
M6	Thermal Switch	106542	
	Printed Board	106159	Video IF (Less Tubes)
	Printed Board	106161	Sync & Vert. (Less Tubes)
	Printed Board	106079	Vert., Sub-Assembly
	Printed Board	106160	Horiz. Osc. (Less Tubes)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	106085	
Mask	106292	Models 21PT9095, U
Mask	106082	Models 21T9112, 5, 7, & U
Knob	106285	VHF Channel Selector, Model 21PT9095
Knob	106097	VHF Channel Selector, Model 21T9112
Knob	106095	VHF Channel Selector, Model 21T9115
Knob	106096	VHF Channel Selector, Model 21T9117
Knob	106286	VHF-UHF Channel Selector, Model 21PT9095U
Knob	106101	VHF-UHF Channel Selector, Model 21T9112U
Knob	106098	VHF-UHF Channel Selector, Model 21T9115U
Knob	106099	VHF-UHF Channel Selector, Model 21T9117U
Knob	102749	UHF Channel Selector, Model 21PT9095U
Knob	102580	UHF Channel Selector, Model 21T9112U
Knob	102653	UHF Channel Selector, Model 21T9115U
Knob	102578	UHF Channel Selector, Model 21T9117U
Knob	104399	Fine Tuning, Models 21PT9095, U
Knob	104401	Fine Tuning, Models 21T9112, U
Knob	104397	Fine Tuning, Models 21T9115, U
Knob	104398	Fine Tuning, Models 21T9117, U
Knob	106103	UHF Dial, Models 21PT9095U, 21T9117U
Knob	106104	UHF Dial, Models 21T9112U
Knob	106102	UHF Dial, Model 21T9115U
Knob	106284	Volume-On-Off, Models 21PT9095, U
Knob	106094	Volume-On-Off, Models 21T9112, U
Knob	106093	Volume-On-Off, Models 21T9115, U
Knob	106100	Volume-On-Off, Models 21T9117, U
Knob	102581	Brightness, Vert. Hold, Tone
Knob	106283	Contrast, Models 21PT9095, U
Knob	106092	Contrast, Models 21T9112, U
Knob	106090	Contrast, Models 21T9115, U
Knob	106091	Contrast, Models 21T9117, U
Cabinet	Z4354	Models 21PT9095, U
Cabinet	Z4340	Models 21T9112, U
Cabinet	Z4341	Models 21T9115, U
Cabinet	Z4342	Models 21T9117, U
Cover	105845	Hidden Control, Models 21T9112, U
Cover	106081	Hidden Control, Models 21T9115, U
Cover	104912	Hidden Control, Models 21T9117, U
Handle	104649	Models 21PT9095, U
Antenna	104457	Includes cabinet back, Models 21PT9095, U
Antenna	104458	UHF Loop, Models 21PT9095, U

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

ALIGNMENT INSTRUCTIONS (cont)

ALTERNATE SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR

Connect the negative lead of a 10 volt bias supply to point (A). Positive to chassis.
Set Contrast fully clockwise.
Set VTVM for negative voltage readings.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (400∿ FM Mod. 15KC Swp)	Any non-interfering channel	DC probe thru diode probe (Fig. 5) to pin 7 (grid 3) of 6DT6 (V7). Common to chassis.	A7, A8, A9	Adjust for maximum negative DC on meter. Attenuate generator output for a reading between 1.0 and 1.5 volts on meter when finally peaked. Peak A7 and A8 with maximum core separation. Adjust A9 for maximum.
11.	"	"	"	"	USE SCOPE Connect across speaker voice coil	A10	Adjust for maximum 400∿ indication on scope. Adjust Volume control for 0.7 volts peak to peak on scope when peaked.
12.	"	"	"	"	"		Decrease input signal to MINIMUM usable level and retouch A7, A8 and A9 for symmetrical breakout similar to Fig. 6.

4.5MC TRAP ALIGNMENT

Set Contrast fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
13.	.01mfd	High side to point (B). Low side to chassis.	4.5MC (400∿ 30% AM)	Any non-interfering channel	Vert. Amp. thru demodulator probe to pin 7 (cathode) of picture tube. Low side to chassis.	All	Adjust for MINIMUM 400∿ indication on scope.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6 & 19

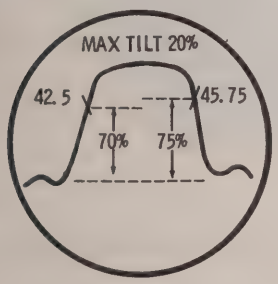


FIG. 1

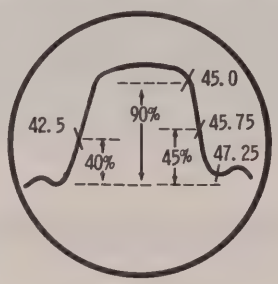


FIG. 2

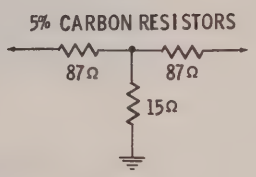


FIG. 3

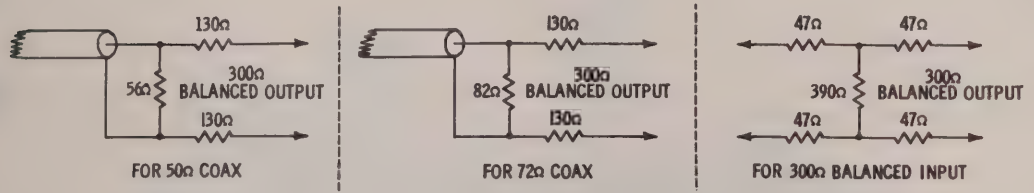


FIG. 4

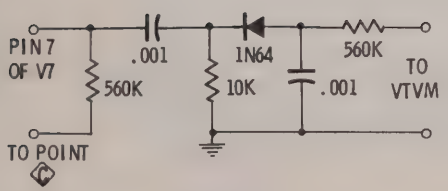


FIG. 5

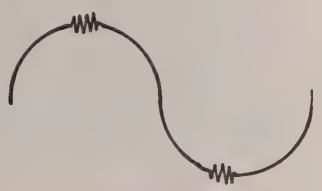
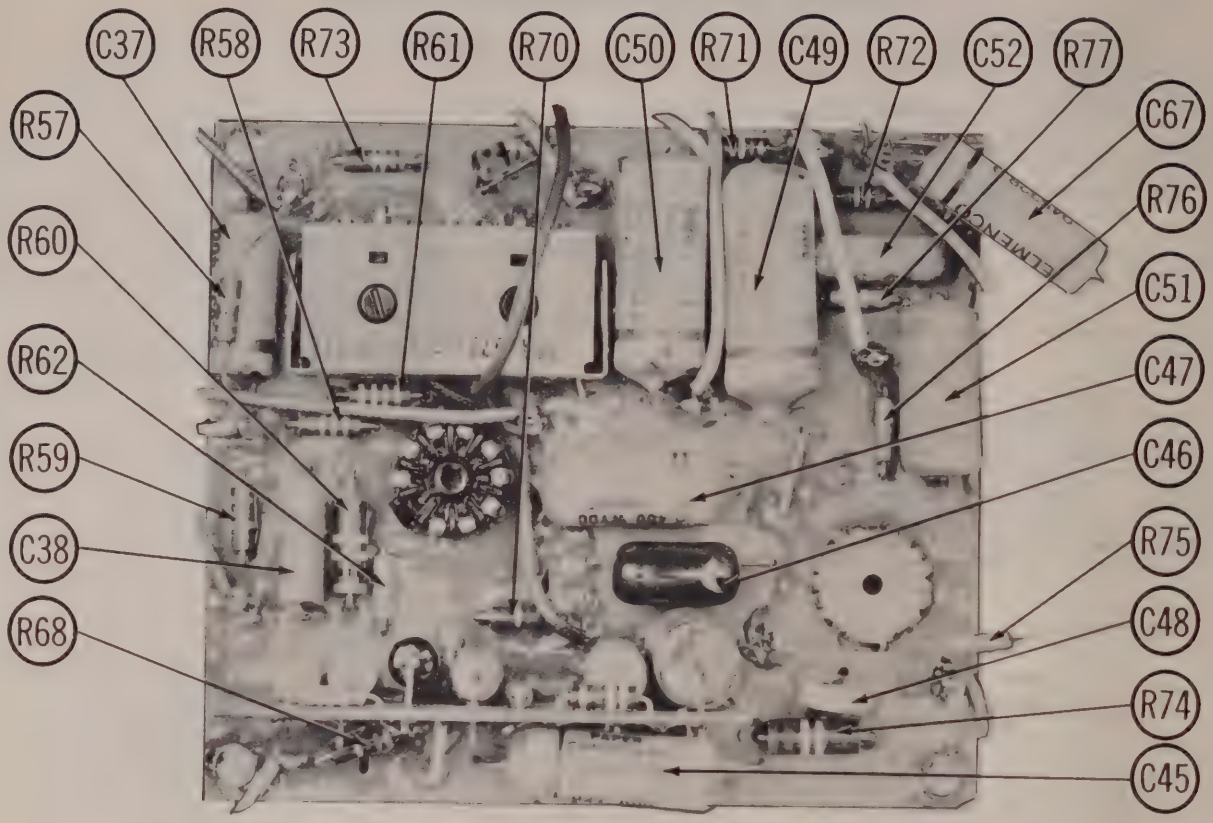


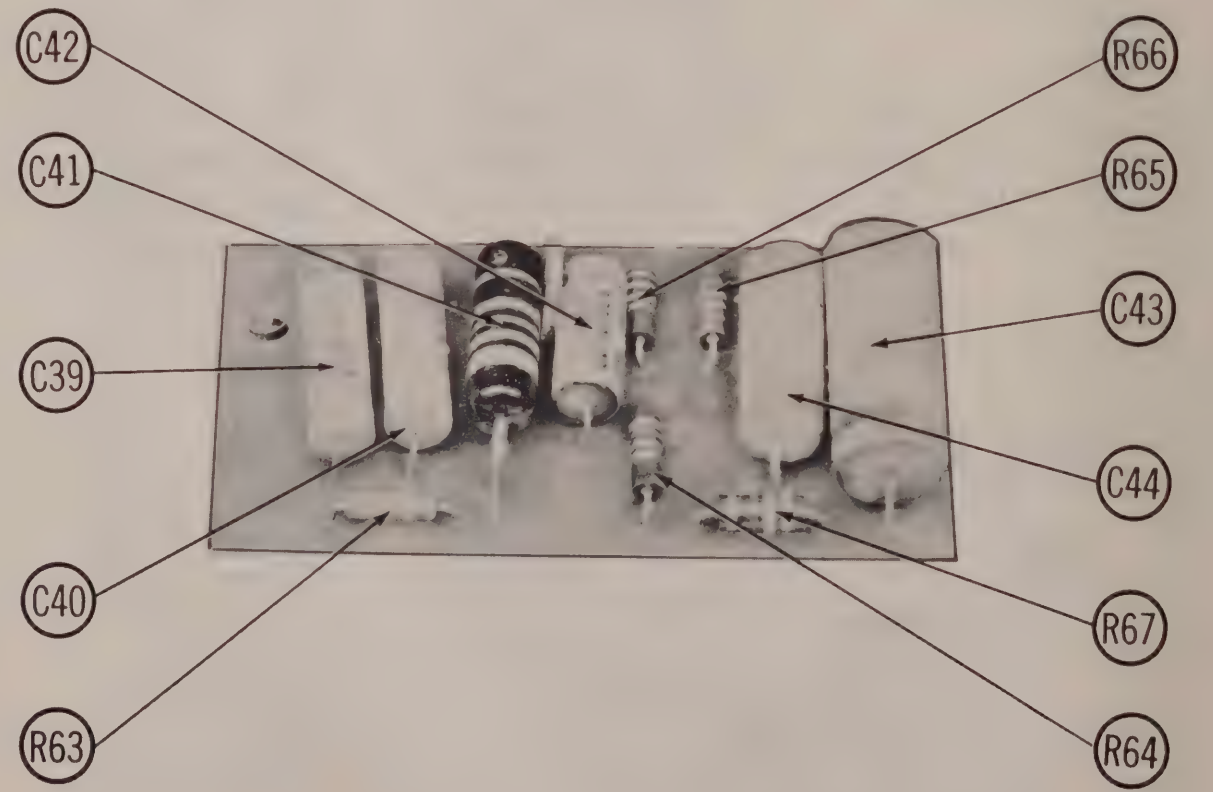
FIG. 6

RCA VICTOR MODELS 21PT9095, U, 21T9112, U, 21T9115, U, 21T9117, U (Ch. KCS117A, B)

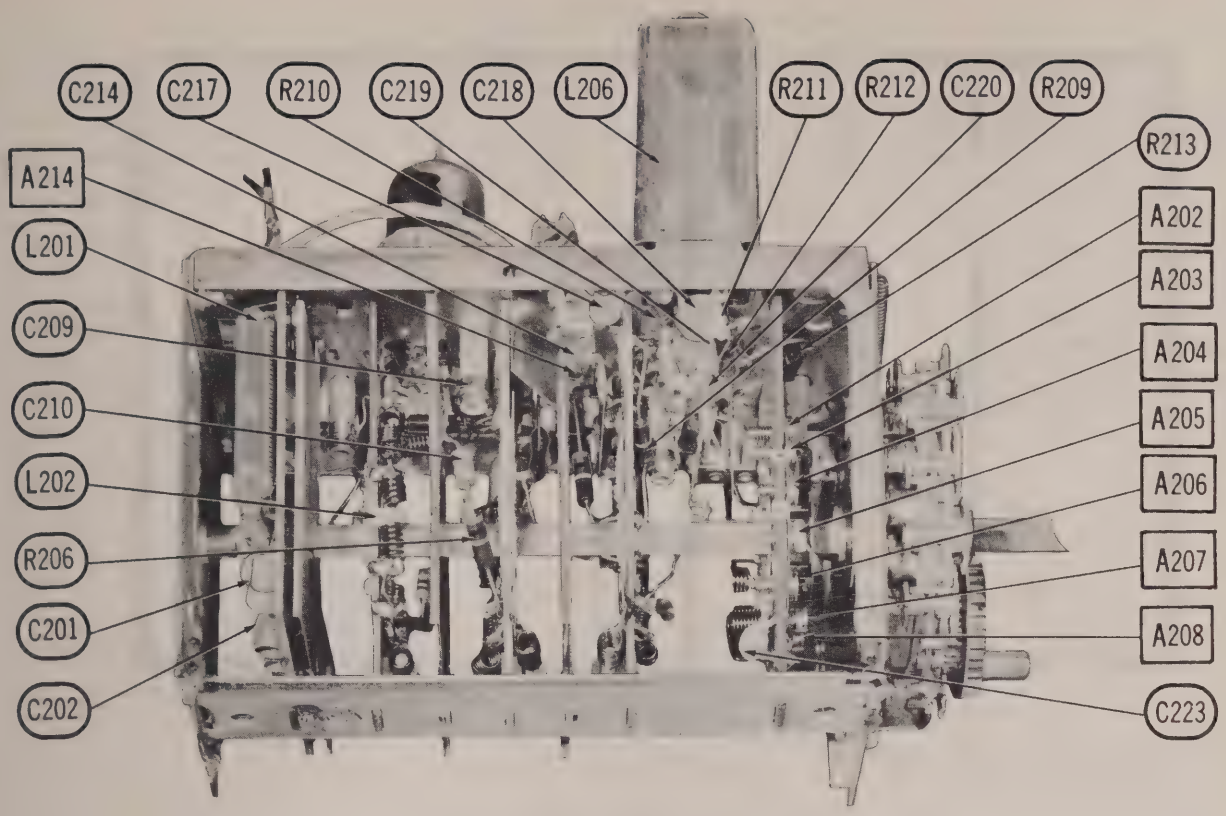
FOLDER 2



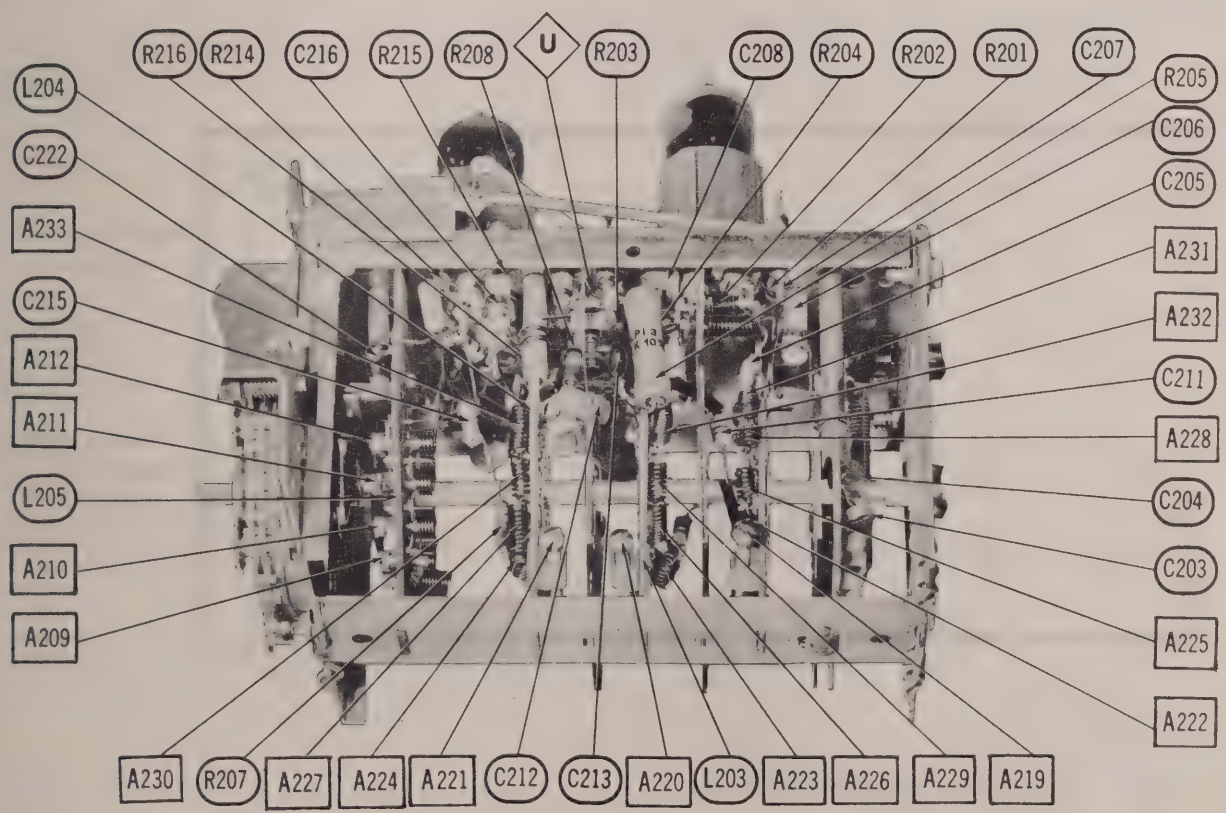
SYNC & VERTICAL PRINTED BOARD



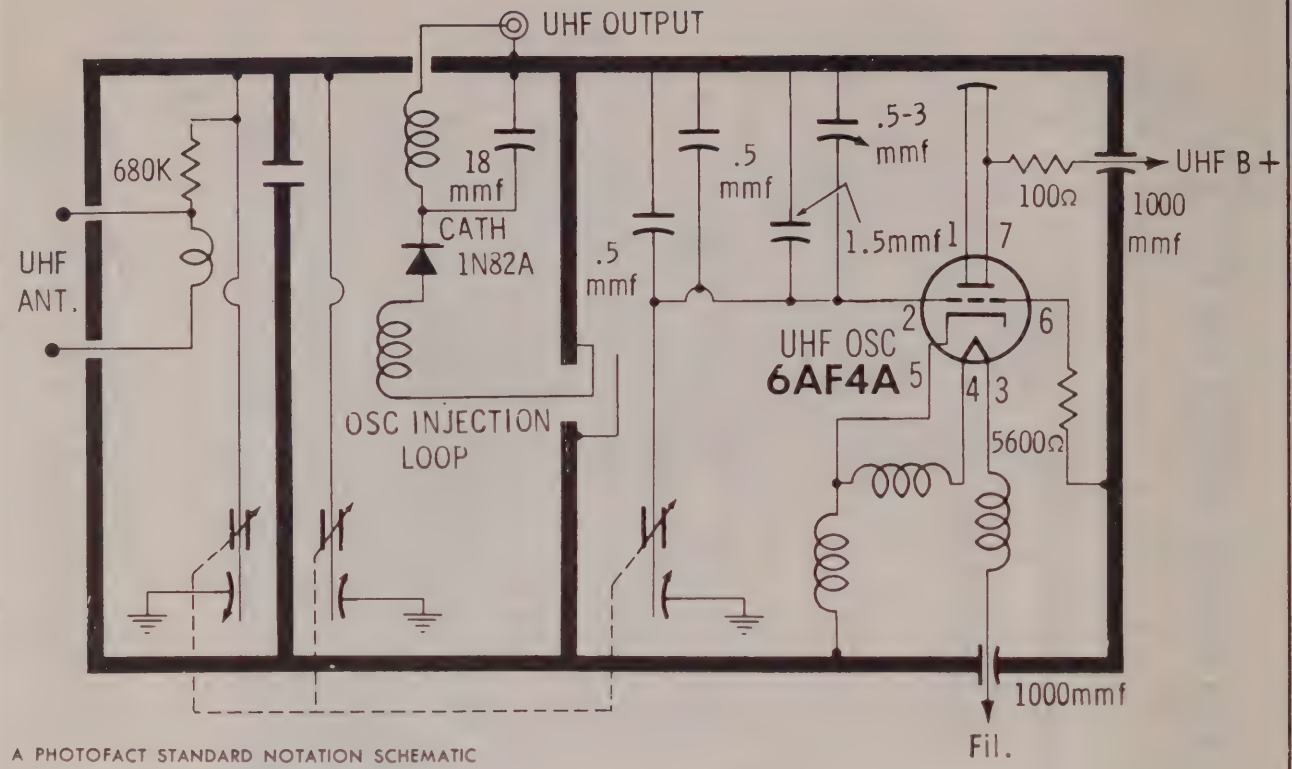
VERTICAL SUB ASSEMBLY



TUNER LEFT SIDE



TUNER RIGHT SIDE



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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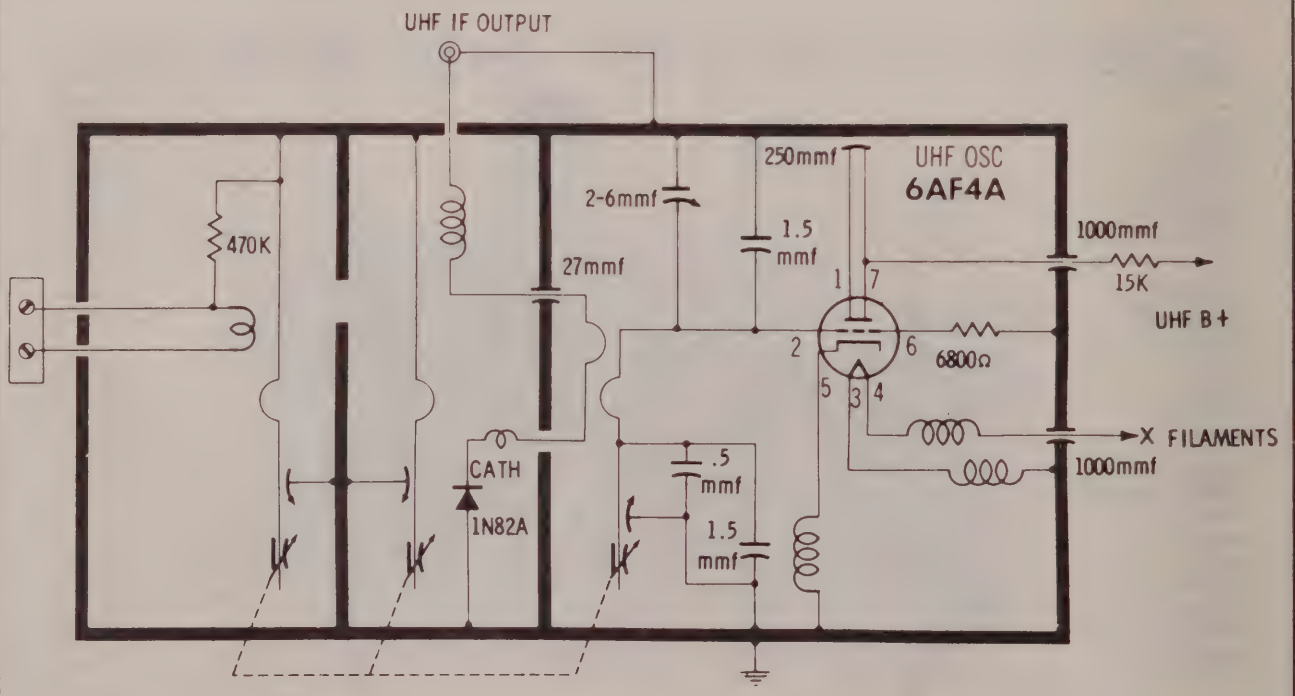
UHF TUNER KRK66A



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE CIRCUIT UHF TUNER KRK66A

TUNER ALIGNMENT INSTRUCTIONS (cont)

UHF IF ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Fig. 201	High side thru adaptor (Fig. 203) to point (V). Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC	UHF	Connect 330mmf capacitor in series with a 180Ω resistor from plate of Mixer (V202) to chassis with resistor next to chassis. High side of scope thru demodulator probe to junction of capacitor and resistor. Low side to chassis.	A234, A235	Use only enough sweep generator output to provide a usable pattern on scope. Adjust A234 and A235 for response similar to Fig. 204.
23.	Two 120Ω Carbon Resistors	Across UHF terminals with 120Ω in each lead. Reconnect cable from UHF tuner to VHF tuner Connect separate marker generator loosely to grid of 1st Video IF Amp.(V1).	Tune over entire UHF range	42.5MC 45.0MC 45.75MC	Tune over UHF range	Across Video Det. load.		Use only enough sweep generator output to provide a usable pattern on scope. Check tracking across UHF band if necessary, retouch A234 and A235 for response similar to Fig. 205.

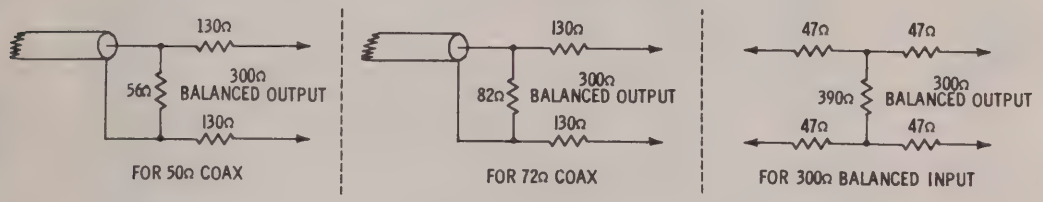


FIG. 201

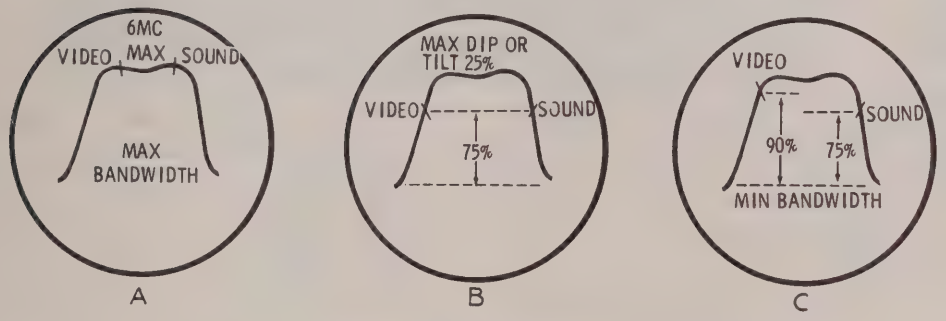


FIG. 202

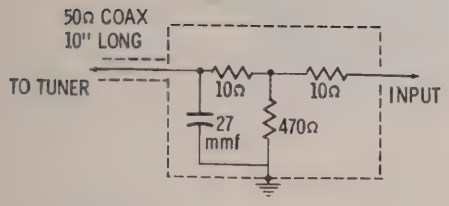


FIG. 203

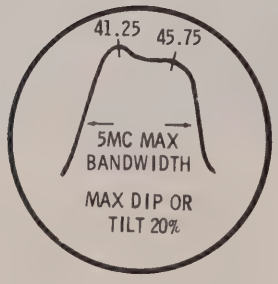


FIG. 204

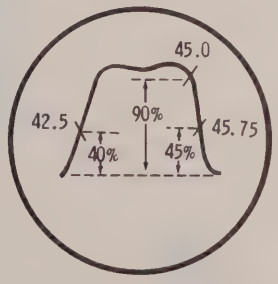


FIG. 205

TUNER PARTS LIST AND DESCRIPTIONS

KRK 46U, W, KRK 72H, J, K

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BZ7A	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CQ8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	18		102646		DTZ-18		CNO-418	5GA-Q18	5%
C202	5		102571		DTZ-5		CNO-547	5GA-V5	5%
C203	27		102352		DTZ-27		CNO-427	5GA-Q27	5%
C204	33		102573		TCZ-33		CNO-433	5TCC-Q33	NPO 5%
C205	220		100672	DI 220	DD-221	L10T22	B-322	5GA-T22	
C206	.34-3		105757						
C207	1000		105660	EF-001	MFT-1000			503C-D1	
C208	220		100672	DI 220	MD-221	L10T22	JL-322	5GA-T22	10%
C209	.34-3		105757						
C210	.22		105857						
C211	1.0		77690	NPO-SI 1	TCZ-1		CNO-510	5TCCB-V1	10%
C212	270		77838	NPO-SI 270	D6-271			5GA-T27	10%
C213	82		103560	1469-000082	DTZ-82	22R5Q82	CNO-482	MS-482	5%
C214	140-220		103519						
C215	1.0		105781					5TCCB-V1	NPO ±.1mmf
C216	.34-3		105757						
C217	1000		77252	BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C218	68		104224		DTN-68		CN7-468	5TCU-Q68	N750 5% ①
C219	470		78622	DI 470	MD-471		JL-347	5GA-T47	10%
C220	8		106043	NPO-SI 8.2		LT8V8		5GA-V8	10%
C221	1000		105660	EF-001	MFT-1000			503C-D1	
C222	12		106193						N220 5%
C223	68		105855	DI 68	DD-680	L10Q68	CNO-468	5GA-Q68	10%
C224	1000		105660	EF-001	MFT-1000			503C-D1	
C225	1000		105660	EF-001	MFT-1000			503C-D1	

① Tuner KRK72J uses 120mmf 10% in this application (Part #106194).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R201	10K 10%			
R202	100K 5%			
R203	1meg 5%			
R204	1meg 5%			
R205	1800Ω	3	106719	
R206	100Ω 5%			
R207	3300Ω 5%			
R208	100K 5%			

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R209	100K 5%			
R210	27K 5%			
R211	470Ω 5%			
R212	1000Ω 5%			
R213	5600Ω 5%			
R214	6800Ω 5%			
R215	100Ω 5%			
R216	120Ω 5%			
R217	100K 5%			

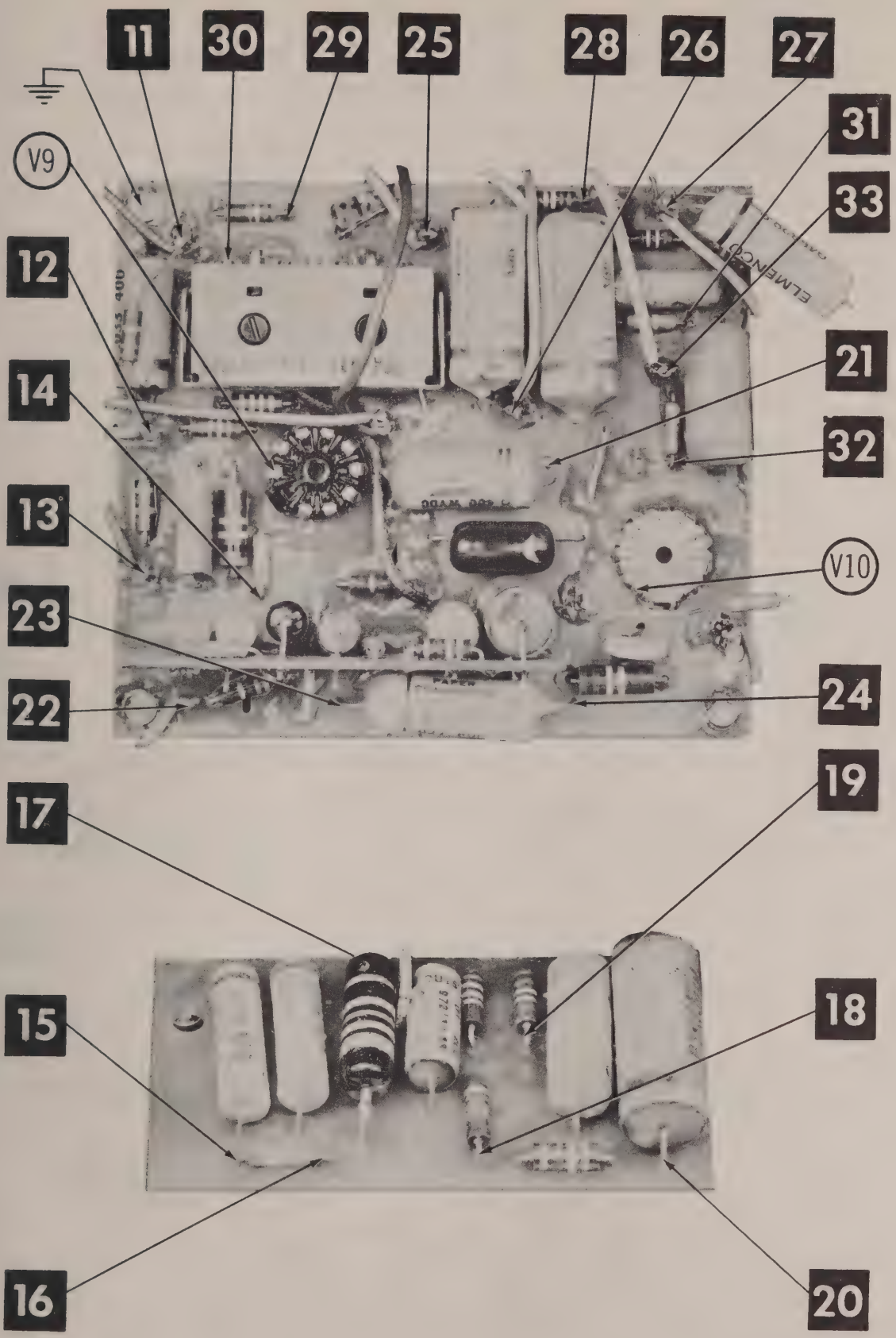
COILS (RF-IF)

ITEM No.	USE	RCA Victor PART No.	NOTES
L201	Ant. Trans.	105924	Includes IF Trap Assy.
L202	Ant. Coils	103564	Channel 2-13, Includes wafer assy.
L203	RF Coils	103562	Channel 2-13, Includes wafer assy.

ITEM No.	USE	RCA Victor PART No.	NOTES
L204	Mixer Grid Coils	103563	Channel 2-13, Includes wafer assy.
L205	Osc. Coils	106503 ①	Channel 2-13, Includes wafer assy.
L206A B	Mixer Plate Trap Coil	105506	

① Tuners KRK46U, W use Part #106192.

CircuiTrace Numbers 11 thru 33



A Howard W. Sams CIRCUITRACE® Photo

SYNC & VERT
PRINTED BOARD

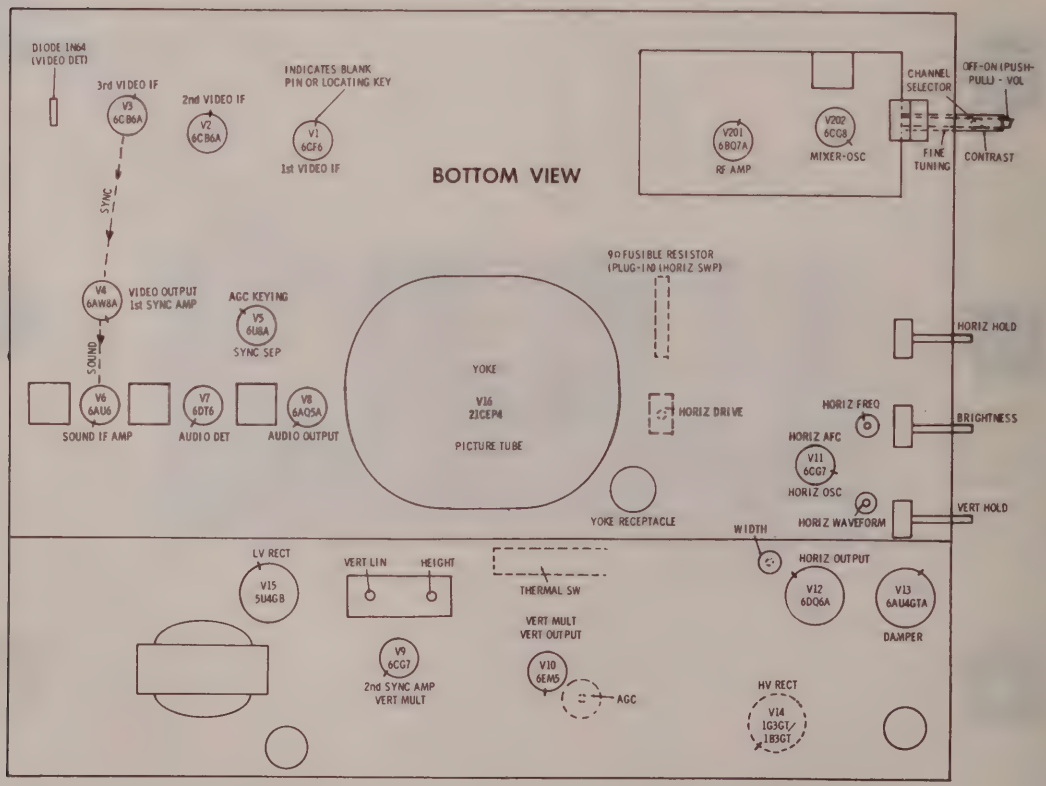
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

RESISTANCE MEASUREMENTS

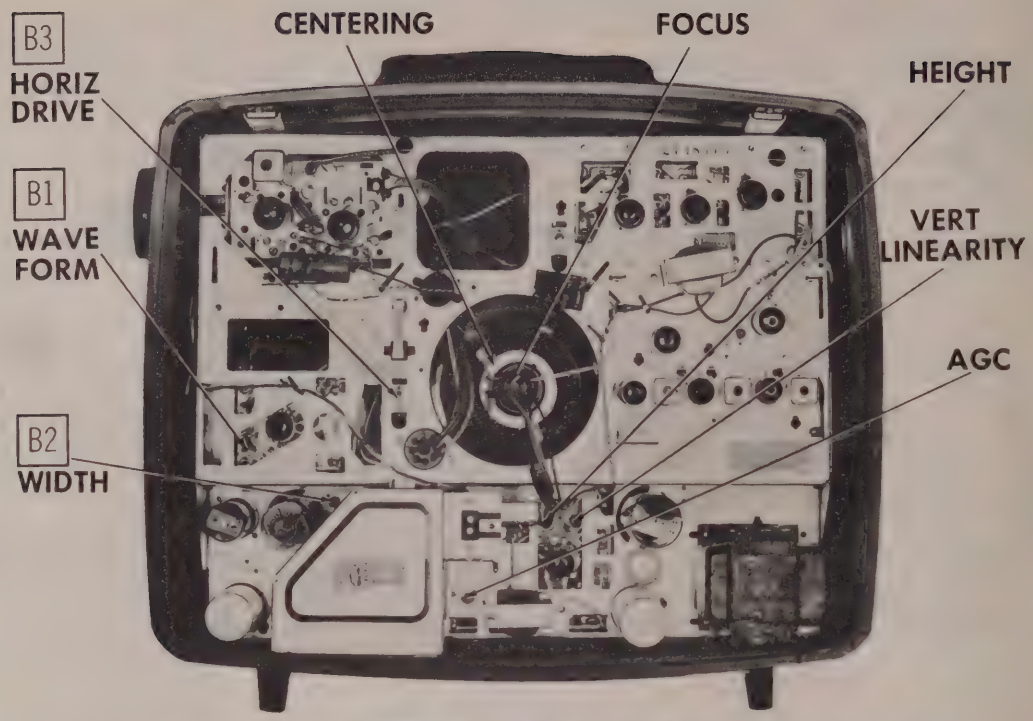
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CF6	470K	68Ω	.1Ω	0Ω	††680Ω	††680Ω	0Ω		
V2	6CB6A	100K	††33Ω	.1Ω	0Ω	†680Ω	†680Ω	100K		
V3	6CB6A	.1Ω	180Ω	.1Ω	0Ω	†5200Ω	†5200Ω	0Ω		
V4	6AW8A	39Ω	1800Ω	†20K	0Ω	.1Ω	• 80Ω	680K	†48K	†6800Ω
V5	6U8A	†1.2meg	• †50K	†0Ω	.1Ω	0Ω	2.5meg	†8000Ω	0Ω	4.2meg
V6	6AU6	47K	0Ω	0Ω	.1Ω	†5700Ω	†16K	82Ω		
V7	6DT6	4.2Ω	560Ω	.1Ω	0Ω	†730K	†15K	470K		
V8	6AQ5A	0Ω	470Ω	.1Ω	0Ω	†2100Ω	†1800Ω	0Ω		
V9	6CG7	†17K	30K	0Ω	0Ω	.1Ω	• †2.1meg	• 2.5meg	0Ω	0Ω
V10	6EM5	†2200Ω	NC	• 1.3meg	.1Ω	0Ω	• 1.3meg	0Ω	NC	†700Ω
V11	6CG7	†0Ω	• 670K	520K	0Ω	.1Ω	†68K	• 70K	67Ω	0Ω
V12	6DQ6A	TP	0Ω	NC	†4700Ω	1meg	TP	.1Ω	100Ω	TOP CAP †18.3Ω
V13	6AU4GTA	NC	NC	¶6meg	NC	†2.3Ω	NC	0Ω	.1Ω	
V14	1G3GT/ 1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †348Ω
V15	5U4GB	NC	¶	NC	26Ω	NC	28Ω	NC	¶	
V16	21CEP4	0Ω	22K	†290K	†0Ω	NC	22K	• 190K	.1Ω	
V201	6BQ7A	†2100Ω	550K	650K	0Ω	.1Ω	650K	3meg	0Ω	0Ω
V202	6CQ8	†370Ω	100K	INF	.1Ω	0Ω	INF	0Ω	INF	INF
ITEM	TYPE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 255V SOURCE.
†† MEASURED FROM PIN 7 OF V2.
‡ MEASURED FROM PIN 3 OF V13.

NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Before adjusting the Waveform slug (B1), the Horizontal Drive and Width must be properly adjusted.

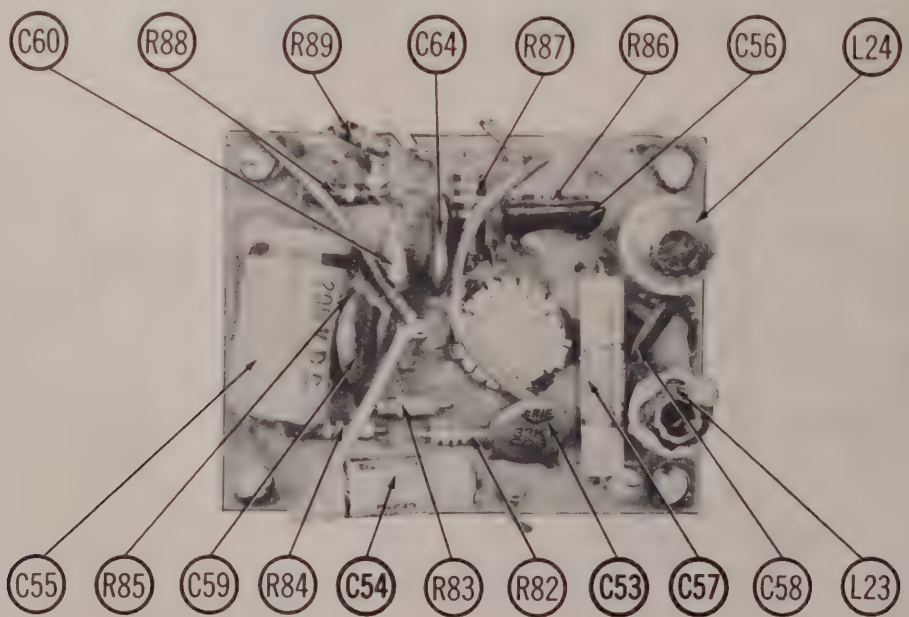
Set the Horizontal Hold control to the pull-in point. Turn the Width slug (B2) fully counterclockwise and turn Horizontal Drive trimmer (B3) counterclockwise until a bright vertical line appears near the center of the raster, then turn clockwise until the line just disappears. If no line appears, leave B3 fully counterclockwise.

With the Brightness control set to normal level, adjust the Width slug (B2) for an overscan of approximately 3/4" on each side of the screen at normal line voltage.

Connect a short jumper across the terminals of the Horizontal Waveform coil (L24) and short the grid (pin 2) of the 6CG7 (V10) to chassis with a small screwdriver.

Adjust the Horizontal Hold control for an upright picture (may appear to float back and forth across the screen). Remove the jumper from across L24 and adjust B1 to again obtain a picture in an upright position.

When B1 is properly adjusted, alternately shorting and removing short should not cause the picture to lose sync but instead cause a slight sideways shift of the picture. Remove the short from the grid of the 6CG7.



HORIZONTAL
PRINTED BOARD

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PRODUCTION CHANGE BULLETIN 216

MODELS 21C611 SERIES, 21M120 SERIES, 21M204 SERIES, 21T118 SERIES (Ch. 1-539-1, -2, 1-540-5, -6, 1-541-1, -2)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 4 IN SET 389	
	Sylvania Models 21C407, 21C408, 21C409, 21C512, 21C513 Series, 21P101 Series, 21T113, 21T114, 21T115, 21T213 Series (Ch. 1-539-1, -2, 1-540-1, -2, -3, -4) were covered in Photofact Folder 4 - Set 389. Models 21C611 Series, 21M120 Series, 21M204 Series, 21T118 Series (Ch. 1-539-1, -2, 1-540-5, -6, 1-541-1, -2) are added, along with late production changes, with the publication of this bulletin.
Ch. 1-539-1, -2 Code C08	COMPONENT CHANGES R57 is omitted. R54 is increased from 27K to 33K. The resistor added from R7 to the 215V source is decreased from 18K to 10K. K5 (Sync Coupling) is changed to Part #190-0043. With this change, terminal 2 of K5 is connected to ground. A 10K ½ watt resistor is added from pin 6 of V10 to ground. R58 is increased in wattage from 1 watt to 2 watts. R56 is disconnected from the junction of R40 and C46 and reconnected to terminal D of T4.
Ch. 1-539-1, -2 Code C09	COMPONENT CHANGE The 2 amp. Slo-Blo fuse added from R91 to R92 is changed to 2.5 amp. Fast-Blo.
Ch. 1-539-1, -2 Code C10	COMPONENT CHANGES The 10K ½ watt resistor added in Code C08 is increased in wattage from ½ watt to 1 watt. R82 is increased from 2200Ω to 6800Ω.
Ch. 1-539-1, -2 Code C11	COMPONENT CHANGE C66 is decreased from .47mfd to .0056mfd. This this change, C66 is disconnected from the white lead of T2 and reconnected to the blue lead of T2.
Ch. 1-540-1, -2 Code C20, C21 Ch. 1-540-3, -4 Code C16, C17 Ch. 1-540-5, -6 Code C01	COMPONENT CHANGES R57 is omitted. R54 is increased from 27K to 33K. The resistor added from R7 to the 215V source is decreased from 18K to 10K. K5 (Sync Coupling) is changed to Part #190-0043. With this change, terminal 2 of K5 is connected to ground. A 10K ½ watt resistor is added from pin 6 of V10 to ground. R58 is increased in wattage from 1 watt to 2 watts. R56 is disconnected from the junction of R40 and C46 and reconnected to terminal D of T4.
	VHF TUNER CHANGED The VHF Tuner is changed to Part #323-0094 and is electrically similar to VHF Tuner Part #323-0090 covered in Photofact 4 - Set 389.

PRODUCTION CHANGE BULLETIN 216

PRODUCTION CHANGE BULLETIN 216

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

Ch.1-540-1, -2 Code C22 Ch. 1-540-3, -4 Code C18 Ch. 1-540-5, -6 Code C01	COMPONENT CHANGES The 18K resistor dotted in from R7 to the 215V source is used in this code production. R7 (AGC) is 190K in this code production.
Ch.1-540-3, -4 Code C19	COMPONENT CHANGES The resistor added from R7 to the 215V source is decreased from 18K to 10K. R7 (AGC) is 150K in this code production. TO IMPROVE HORIZONTAL SWEEP R82 is increased from 2200Ω to 6800Ω.
Ch.1-540-1, -2 Code C23 Ch. 1-540-3, -4 Code C20 Ch. 1-540-5, -6 Code C04	COMPONENT CHANGE The 2 Amp. Slo-Blo fuse added from R91 to R92 is changed to 2.5 Amp. Fast-Blo.
Ch. 1-540-5, -6 Code C02	COMPONENT CHANGES The resistor added from R7 to the 215V source is decreased from 18K to 10K. R7 (AGC) is 150K in this code production.
Ch.1-540-5, -6 Code C03	TO IMPROVE HORIZONTAL SWEEP R82 is increased from 2200Ω to 6800Ω.
Ch.1-540-2 Code C24	VHF TUNER CHANGED The VHF Tuner is changed to Part 323-0094 and is electrically similar to VHF Tuner Part #323-0090 covered in Photofact Folder 4 - Set 389.
Ch.1-540-1, -2 Code C25 Ch. 1-540-3, -4 Code C21 Ch. 1-540-5, -6 Code C05	COMPONENT CHANGE C66 is decreased from .47mfd to .0056mfd. With this change, C66 is disconnected from the white lead of T2 and reconnected to the blue lead of T2.
Ch.1-541-1, -2 Code C01	COMPONENT CHANGES R57 is omitted. R54 is increased from 27K to 33K. The resistor added from R7 to the 215V source is decreased from 18K to 10K. K5 (Sync Coupling) is changed to Part #190-0043. With this change, terminal 2 of K5 is connected to ground. A 10K ½ watt resistor is added from pin 6 of V10 to ground. R58 is increased in wattage from 1 watt to 2 watts. R56 is disconnected from the junction of R40 and C46 and reconnected to terminal D of T4. VHF TUNER CHANGED The VHF Tuner is changed to Part #323-0094 and is electrically similar to VHF Tuner Part #323-0090 covered in Photofact Folder 4 - Set 389.
Model 21C611	COMPONENT CHANGES R3 (Brightness) is changed to Part #153-0153. R2 (Contrast) is increased from 15K to 25K (Part #153-0152). R1 (Volume) is changed to Part #153-0151.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 332

MODEL HF35A

Rauland Model HF355 was covered in Photofact Folder 13 - Set 332.

Model HF355A is electrically identical to the model covered except for the following changes.

COMPONENT CHANGES

R7 is disconnected from the junction of R13 and R15 and reconnected to pin 6 of V1.

R52 is increased from 33K to 47K.

R53 is dcreased from 68K to 47K.

L2 (RF Choke) is replaced by an 1800Ω ½W resistor.

L1 (Ant. Coil) is changed to Part #LW-0107.

L8 (Loopstick) Part #LW-0098 is changed to an Ant. Transformer (Part #LW-0109).

T2 (Audio Output) is changed to Part #LO-0143.

T1 (Power Transformer) is changed to Part #LP-0252-A.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 12 IN SET 392

MODEL 1290-A

V-M Model 1290 was covered in Photofact Folder 12 - Set 392.

Model 1290-A is electrically identical to the model covered except for the following changes.

RECTIFIER TUBE CHANGED

V3 (Rectifier) is changed from 6V4/EZ80 to 6X4. With this change the following pin numbers change:

Pin 1 remains Pin 1 (Plate).

Pin 7 becomes Pin 6 (Plate).

Pin 3 becomes Pin 7 (Cathode).

Pin 4 remains Pin 4 (Filament).

Pin 5 becomes Pin 3 (Filament).

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 16 IN SET 412

MODELS ROYAL 450 V, W, Y (Ch. 7AT45Z1)

Zenith Model Royal 300F (Ch. 7AT42Z1) was covered in Photofact Folder 16 - Set 412.

Models Royal 450V, W, Y (Ch. 7AT45Z1) are electrically identical to the model covered except for the following changes.

COMPONENT CHANGES

R4 is increased from 82K to 180K.

R5 is increased from 1000Ω to 1500Ω.

R8 is increased from 470Ω to 2200Ω.

R10 is increased from 47K to 68K.

R11 is increased from 470Ω to 1000Ω.

R12 is increased from 15K to 27K.

R13 is increased from 2700Ω to 3300Ω.

R15 is increased from 3300Ω to 12K.

R18 is increased from 220Ω to 560Ω.

R19 is increased from 120Ω to 820Ω.

R20 is increased from 4700Ω to 5600Ω.

R21 is decreased from 10Ω to 4.7Ω.

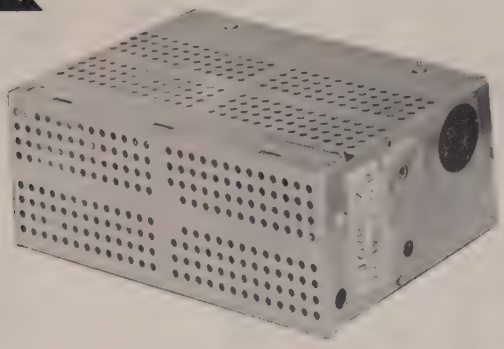
C3 and C4 have been combined into one unit, Part #22-3062.

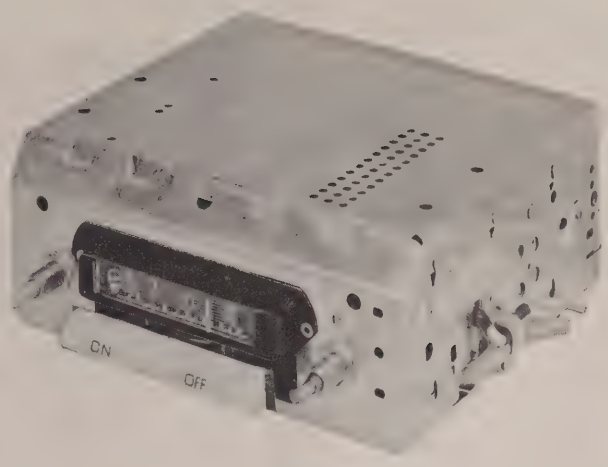
A thermistor, Part #63-3663, is added in parallel with R19.

A .0022mfd Ⓢ 500V ceramic disc capacitor and an 1800Ω ½W resistor (wired in parallel) are added between C4 and the secondary of T2.

PHOTOFACT* Folder

BLAUPUNKT MODEL
Wolfsburg 9160





TRADE NAME	Blaupunkt Model Wolfsburg 9160 (Serial #G450001 and above)
IMPORTER	Robert Bosch Corp., 40-25 Crescent Street, Long Island City 1, N. Y.
TYPE SET	Battery Operated AM Automobile Receiver
TUBES	Five
POWER SUPPLY	6 Volt (or) 12 Volt Storage Battery
RATING	4.4 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	510 - 1600KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3, A4, A5.....GENERAL CEMENT #8195, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2531, 2532
A6.....GENERAL CEMENT #5000, 5003, 5004, 5008, 5009, 5066, 8195, 8277, 8290, 8607, 8821, 9105, 9106, 9291
WALSCO #2515, 2520, 2522, 2523, 2534, 2537, 2538
A7, A8.....GENERAL CEMENT #5000, 5003, 8271, 8273, 8276, 8288, 8290, 8721, 8722
WALSCO #2516, 2519, 2525, 2541

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	Fig. 1	Thru dummy to antenna receptacle	460KC (400~ Mod.)	High frequency end of dial	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	"	"	"	A5	Adjust for MINIMUM output.
3.	"	"	1100KC	Tune to 1100KC signal	"	A6	Adjust for maximum output.
	The following step is not necessary unless tuner has been tampered with or associated circuits have been repaired. If necessary, remove dial scale to expose tuning slugs (A7, A8).						
4.	Fig. 1	Thru dummy to antenna receptacle	1100KC	Tune to 1100KC signal	Across voice coil	A7, A8	Adjust for maximum output. Repeat step 3.
5.	With radio installed in car and antenna fully extended, tune to a weak station near 1100KC and adjust A6 for maximum output.						

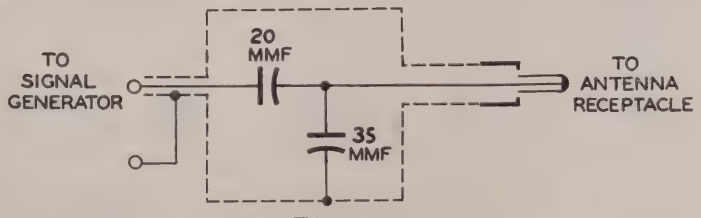


FIG. 1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H899

BLAUPUNKT MODEL
Wolfsburg 9160
BLAUPUNKT MODEL
Wolfsburg 9160
SET 436 FOLDER 4

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	RF Amplifier	EF89/6DA6 ①
V2	Mixer-Osc.	ECH81/6AJ8 ①
V3	IF Amplifier	EF89/6DA6 ①
V4	Det. - AVC - AF Amp.	EBC91/6AV6 ①
V5	Output	EL84/6BQ5 ①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BLAUPUNKT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	32	385	KO761/24x						R2600 *
B	32	385							
C2	50	18	KO742/9n	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C3	50	18	KO742/9n	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C4	50	15	KO748/9n	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

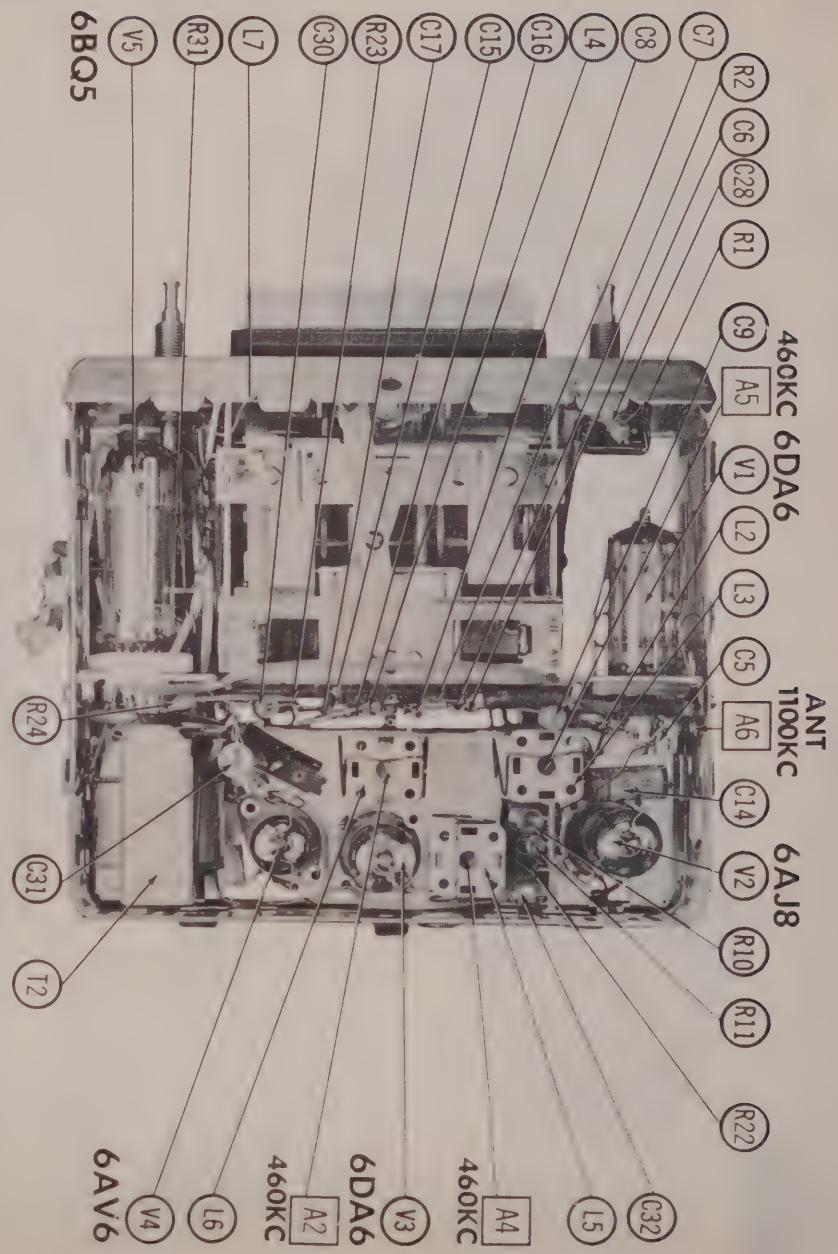
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BLAUPUNKT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	10-60		TK6/15x						
C6	40		KO842/67n						2%
C7	500		KO847/55n	BPD-0005	DD-501	L10T5	UC-535	5GA-T5	
C8	65		KO842/73n						2%
C9	.01	500	KO792/41n	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C10	.01	500	KO792/41n	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C11	.05	125	KO788/66n	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C12	100		KO844/74n	NPO-SI 100	TCZ-100	CTA6T1C	ZT-531	5TCC-T1	5%
C13	50		KO845/51n	NPO-SI 50	TCZ-50	CTA6Q5C	ZT-545	5TCC-Q5	10%
C14	.05	500	KO792/48n	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C15	480		KO1013/36z						2%
C16	35		KO101/7z						
C17	430		KO809/72n						2½%
C18	30		KO843/50n						10%
C19	.01	500	KO792/41n	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C20	1		KO841/2n	NPO-SI 1.0	TCZ-1			5TCCB-V1	25%
C21	.005	500	KO792/67n	P688N-005	D6-502	CUB6D5	GEM-625	6TM-D5	
C22	.01	500	KO792/41n	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C23	90		KO845/57n						
C24	.005	500	KO792/67n	P688N-005	D6-502	CUB6D5	GEM-625	6TM-D5	
C25	.005	500	KO792/67n	P688N-005	D6-502	CUB6D5	GEM-625	6TM-D5	
C26	.1	125	KO788/69n				GEM-201		10%
C27	50		KO845/51n	NPO-SI 50	D6-500	L10Q5	ZT-545	5TCC-Q5	10%
C28	.005	250	KO792/67n	P488N-005	D6-502	CUB6D5	GEM-625	6TM-D5	
C29	90		KO845/57n						
C30	.01	500	KO792/41n	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C31	.005	1000	KO778/66n	P1088N-005		CUB10D5	GEM-1025	10TM-D5	
C32	.05	500	KO792/48n	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C33	.05	500	KO784/48n	P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C34	.1	125	KO770/65n				GEM-201		10%
C35	.025	1000	KO802/45n	P1088N-025					
C36	.1	125	KO788/69n				GEM-201		10%
C37	.1	125	KO788/69n				GEM-201		10%
C38	.05	250		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BLAUPUNKT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	W1749/15x					Volume
B	Switch							Tone

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BLAUPUNKT PART No.	NOTES
R2	100K		WI782/70n	
R3	1meg		WI782/85n	
R4	100K		WI782/70n	
R5	5000Ω		WI782/50n	
R6	1meg		WI782/85n	
R7	30K		WI792/62n	
R8	50K		WI782/65n	
R9	1000Ω		WI782/40n	
R10	30K	2	WI812/62n	
R11	5000Ω	1	WI802/50n	
R12	100K		WI782/70n	
R13	5000Ω	1	WI802/50n	
R14	100K		WI782/70n	
R15	250K		WI782/77n	
R16	1meg		WI782/85n	
R17	5meg		WI782/94n	
R18	1meg		WI782/85n	
R19	500K		WI782/80n	
R20	500K		WI782/80n	
R21	250K		WI782/77n	
R22	50K		WI782/65n	
R23	500K		WI782/80n	
R24	1000Ω		WI782/40n	
R25	30Ω		WI782/17n	
R26	100Ω		WI792/25n	
R27	80Ω		WI793/24n	
R28	500Ω	2	WI840/28n	
R29	200Ω	1	WI802/29n	
R30	200Ω	1	WI802/29n	
R31	40Ω	2	WI858/17n	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA BLAUPUNKT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Antenna Coil	WC2199/2z					
L2	Antenna Coil	WC2204/2z					
L3A	IF Trap						
B	RF Choke	ZF723/1z					
L4	Osc. Coil	WC2205/2z					
L5	Input IF	ZF721/1z					
L6	Output IF	ZF721/2z					
L7	Fil. Choke	WC2115/1z					
L8	"A" Lead Choke	ED706/1z					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA BLAUPUNKT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	6V ③ 1A	240V ③ .045A		TF722/10z						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA BLAUPUNKT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	30	: 1	TF27/52z							

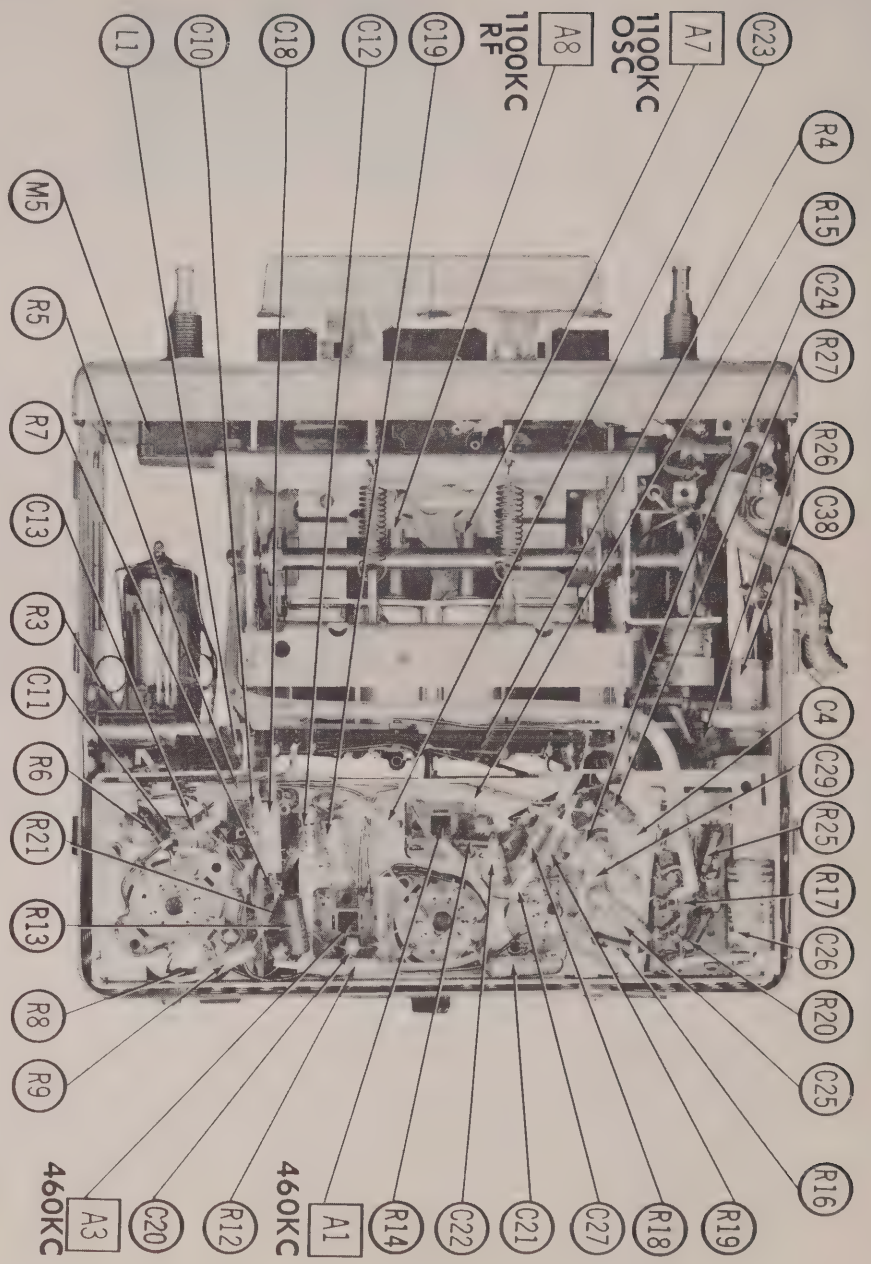
VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA BLAUPUNKT PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M1	Interrupter	6V	115~	SM702/1z				
	Interrupter	12V	115~	SM702/2z ①				① For 12 Volt versions

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA BLAUPUNKT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M2	.045A	XZ737/2x		61-1345	D-64 ①②	① Silicon Type ② Connect series resistor, 10Ω min.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			BLAUPUNKT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3		8A 6V	SG704/1N *	FA741/9n				

* Part #SG704/3n used in 12 Volt versions.

MISCELLANEOUS

ITEM No.	PART NAME	BLAUPUNKT PART No.	NOTES
M4	Lamp	GL701/1x	7V, 1.1A (6 Volt Versions)
	Lamp	GL701/2x	14V, 0.1A (12 Volt Versions)
M5	Switch	SH825/1x	Power On-Off
	Plug	SE718/1x	Connecting Cable
	Socket	FA717/1x	Connecting Cable
	Printed Board	PT4021/1z	

CABINETS & CABINET PARTS

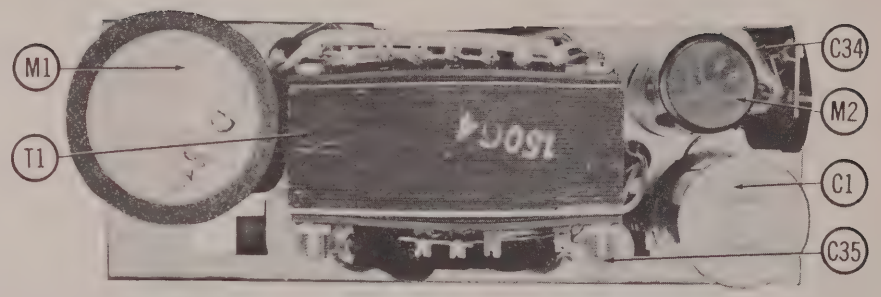
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

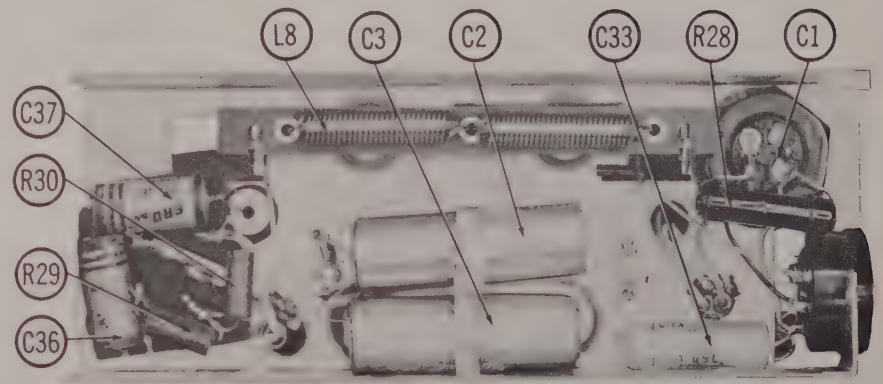
NAME	PART NO.	DESCRIPTION
Pushbutton	KF792/6z	On, Includes Rubber Gasket
Pushbutton	KF792/5z	Off, Includes Rubber Gasket
Pushbutton Set	EV756/16z	
Cabinet	MG830/1z	Power Supply
Cabinet Casing	MG840/3z	Radio, Includes Bushing Type Capacitor
Cover	MG831/2x	Power Supply
Front Plate	MG819/3z	Radio
Top Plate	MG820/3x	Radio
Bottom Plate	MG791/1x	Radio
Dial Pointer	SZ2186/3x	
Dial	SQ2160/9z	Includes Reflector

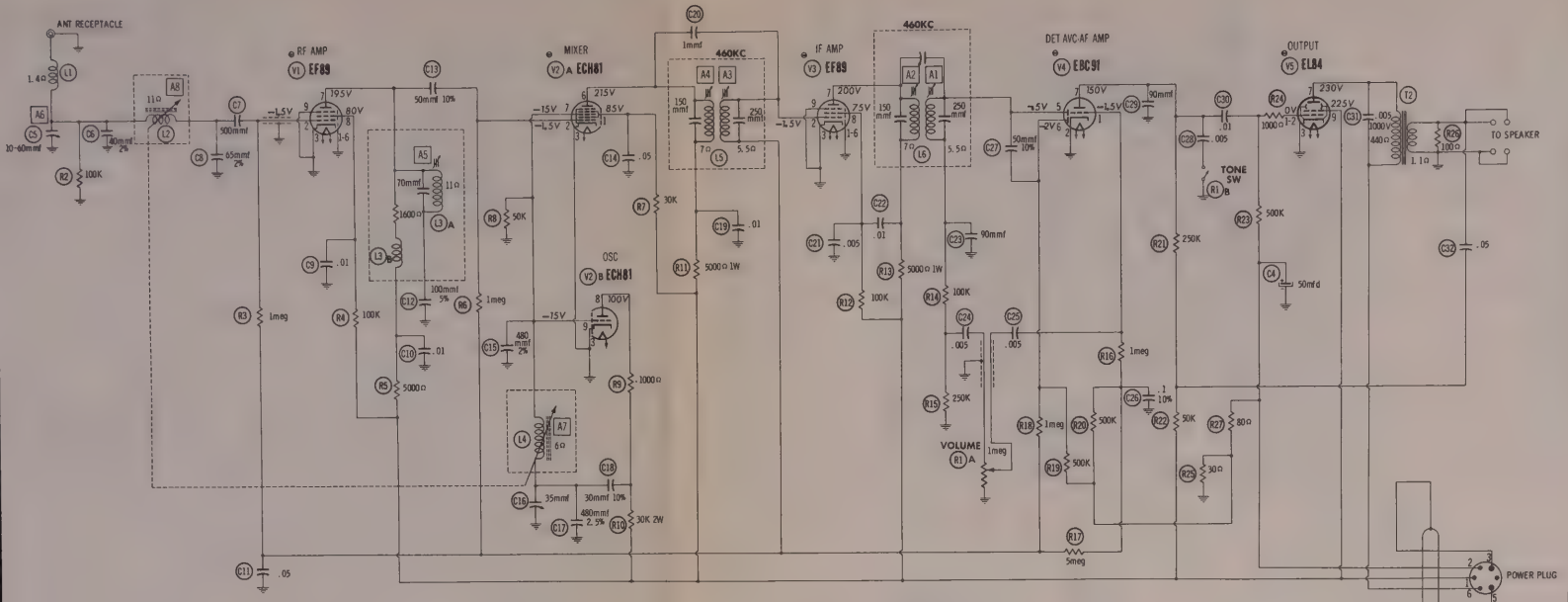
WIRING DATA

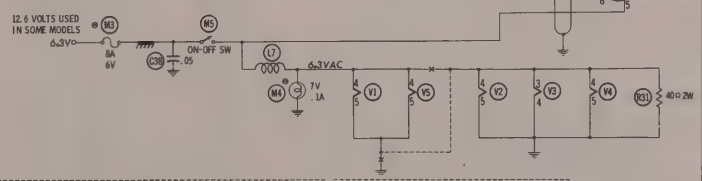
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

POWER CHASSIS







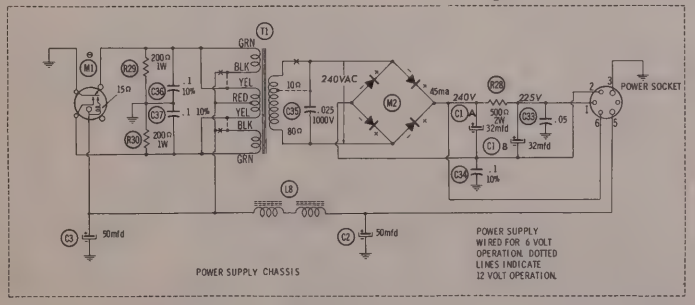


RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF89	0Ω	2.3meg	0Ω	.5Ω	0Ω	0Ω	↑7100Ω	↑100K	0Ω
V2	ECH81	↑30K	2.3meg	0Ω	.5Ω	0Ω	↑5500Ω	50K	↑31K	50K
V3	EF89	0Ω	1.3meg	0Ω	.5Ω	0Ω	0Ω	↑5500Ω	↑100K	0Ω
V4	EBC91	1.5meg	0Ω	.5Ω	0Ω	350K	500K	↑300K		
V5	EL84	500K	500K	0Ω	.5Ω	0Ω	NC	↑440Ω	NC	↑500Ω

↑ MEASURED FROM OUTPUT OF M1
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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BLAUPUNKT MODEL
Wolfsburg 9160

PHOTOFACT* Folder

CHALLENGER MODEL AC10

CHALLENGER
MODEL AC10

CHALLENGER
MODEL AC10

TRADE NAME	Challenger Model AC10
MANUFACTURER	Challenger Amplifier Co., P.O. Box 500, Paramus, N. J.
TYPE SET	AC Operated 10 Watt 6 Channel Audio Amplifier
TUBES	Five
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 47 Watts, .52 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H901

SET 436 FOLDER 5

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamplifier	7025	①
V2	AF Amp. -Phase Inv.	6U8A	
V3	Output	6AQ5	

ITEM No.	USE	TYPE	NOTES
V4	Output	6AQ5	
V5	Rectifier	EZ80/6V4	

① Alternate type 12AX7.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CHALLENGER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲30	350	C536	AFH3-37-95	C0280	FP376.6		T-145	TVLS-3639.11*
B	▲10	350				TC62			
C	■20	350							
C2	5	200	C232	PRS250V4	BBR4-250	TC50X	TD-4-250	MT-4504	TVA-1501
C3	10	25	C228	PRS25V10	BBR10-25	TT50X10	TD-10-25	MT-0210	TVA-1204

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

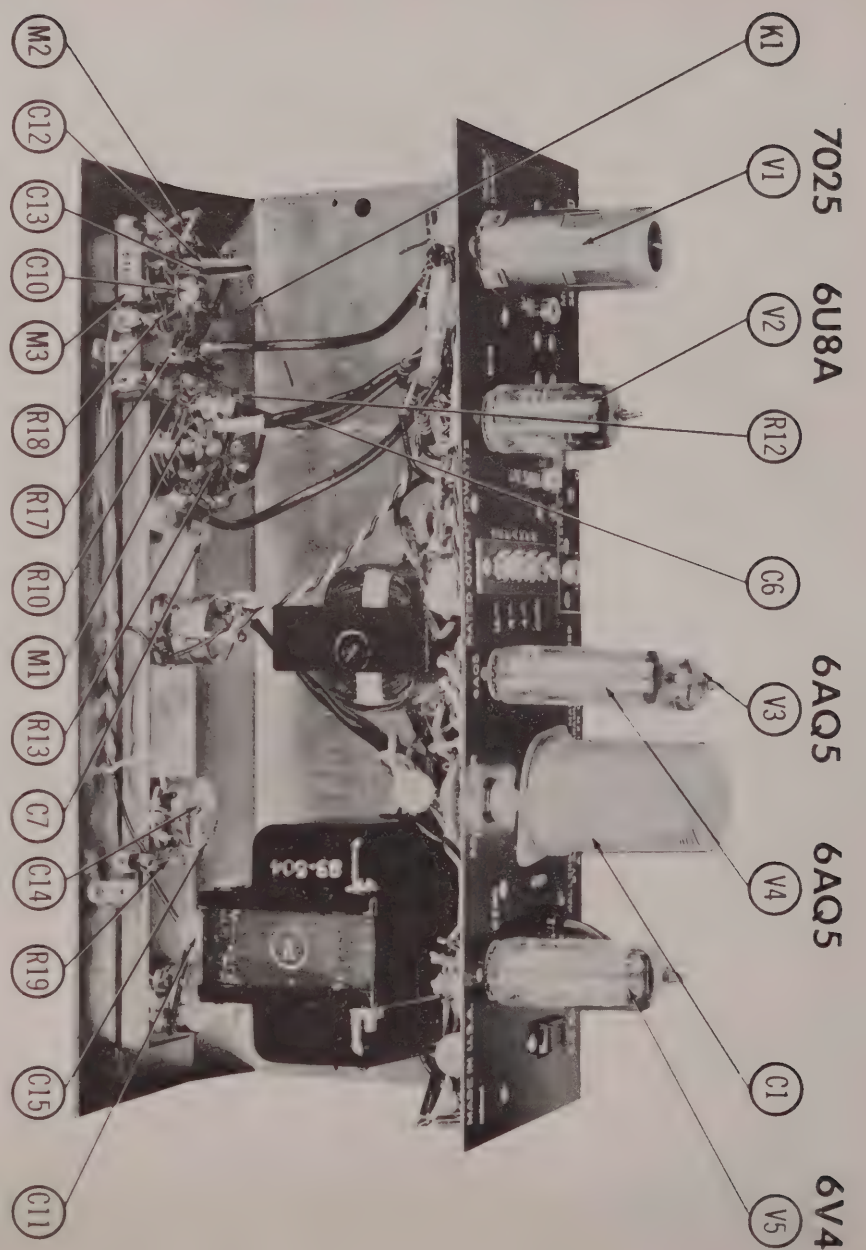
ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	CHALLENGER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	2200					1R5D22		MS-222	10%
C5	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22	
C6	1800					1R5D18		MS-218	10%
C7	.0068	400		P488N-0068	D6-682	CUB6D68	GEM-6268	6TM-D68	
C8	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22	
C9	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22	
C10	470				D6-471	5RT47		MS-347	10%
C11	1800					1R5D18		MS-218	10%
C12	4700					1R5D47		MS-247	10%
C13	4700					1R5D47		MS-247	10%
C14	680				D6-681	1R5T68		MS-368	10%
C15	3300					1R5D33		MS-233	10%
C16	.22	200		P288N-22		CUB2P22	GEM-2022	2TM-P22	
C17	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C18	1.2								
C19	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C20	1200					1R5D12		MS-212	
C21	.1	400		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C22	.047	600		P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CHALLENGER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	V449	B-60	A47-500K-Z	Q13-133	U48	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	
R2A	500K	½	V450	B-60	A47-500K-Z	Q13-133	U48	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	500K	½	V450	B-60	A47-500K-Z	Q13-133	U48	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	50Ω	2(WW)	V113A	WN-50	A43-50	W11-050	R50L	Hum Adjust
B	Shaft			Not Req.	FKS-1/4	SK5	Not Req.	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	CHALLENGER PART No.	NOTES
R5	68K			
R6	47K			
R7	22K			
R8	120K			
R9	3.3meg			
R10	1meg			
R11	220K			
R12	47K			
R13	22K			
R14	3.3meg			
R15	4.7meg			
R16	220K			
R17	750K 5%			
R18	220K			
R19	56K			
R20	150K			

ITEM No.	RATING OHMS	RATING WATT	CHALLENGER PART No.	NOTES
R21	470K			
R22	22K			
R23	150K			
R24	470Ω			
R25	110K 5%			
R26	220K			①
R27	150K			
R28	680K			
R29	33K			
R30	1200Ω	1		
R31	2200Ω	2		
R32	330Ω	2		
R33	680K			
R34	82K			
R35	2.7Ω	1		

① Some versions may use 390K in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA CHALLENGER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .52A	580 VCT ⓐ .070A	6.3V ⓐ 2.1A	83-504	P9214	P-3148		PC8420	26R31U	R-9A ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CHALLENGER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7000Ω CT	16Ω Taps ⓐ 8Ω, 4Ω	T292-3D	Z1011	A-2901 ①	AU-609	A-3870	24S55	S-55X	① Drill new mounting hole

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	CHALLENGER PART No.	REPLACEMENT DATA
K1	Tone Compensation	150mmf, 10000mmf, 150K, 47K, 27K	C421	Sprague TC-8

MISCELLANEOUS

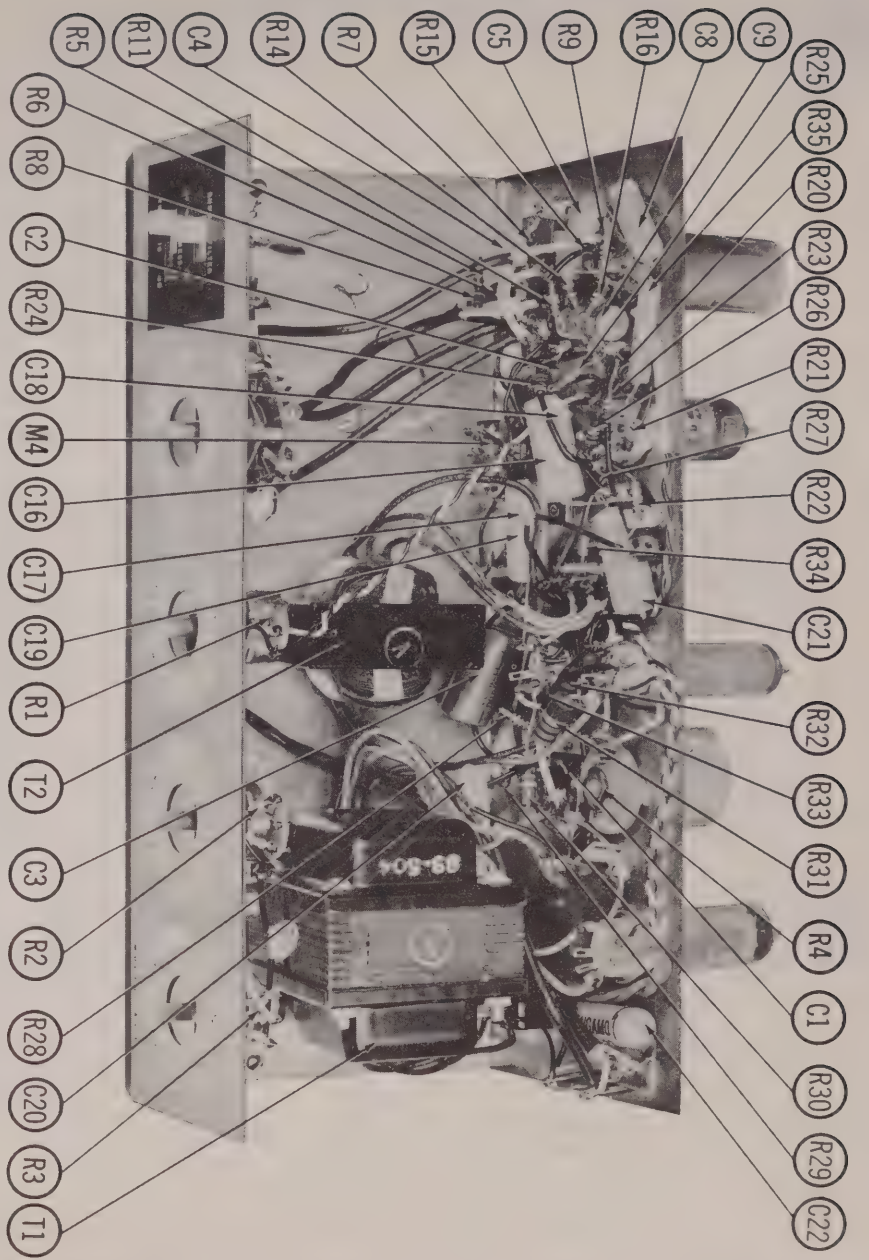
ITEM No.	PART NAME	CHALLENGER PART No.	NOTES
M1	Switch	S506	Selector (5Position, Rotary, Wafer Type)
M2	Switch	S515	Loudness (3Position, Slide Type)
M3	Switch	S514	Rumble Filter (DPDT, Slide Type)
M4	Switch	S514	Stereo On-Off (DPDT, Slide Type)

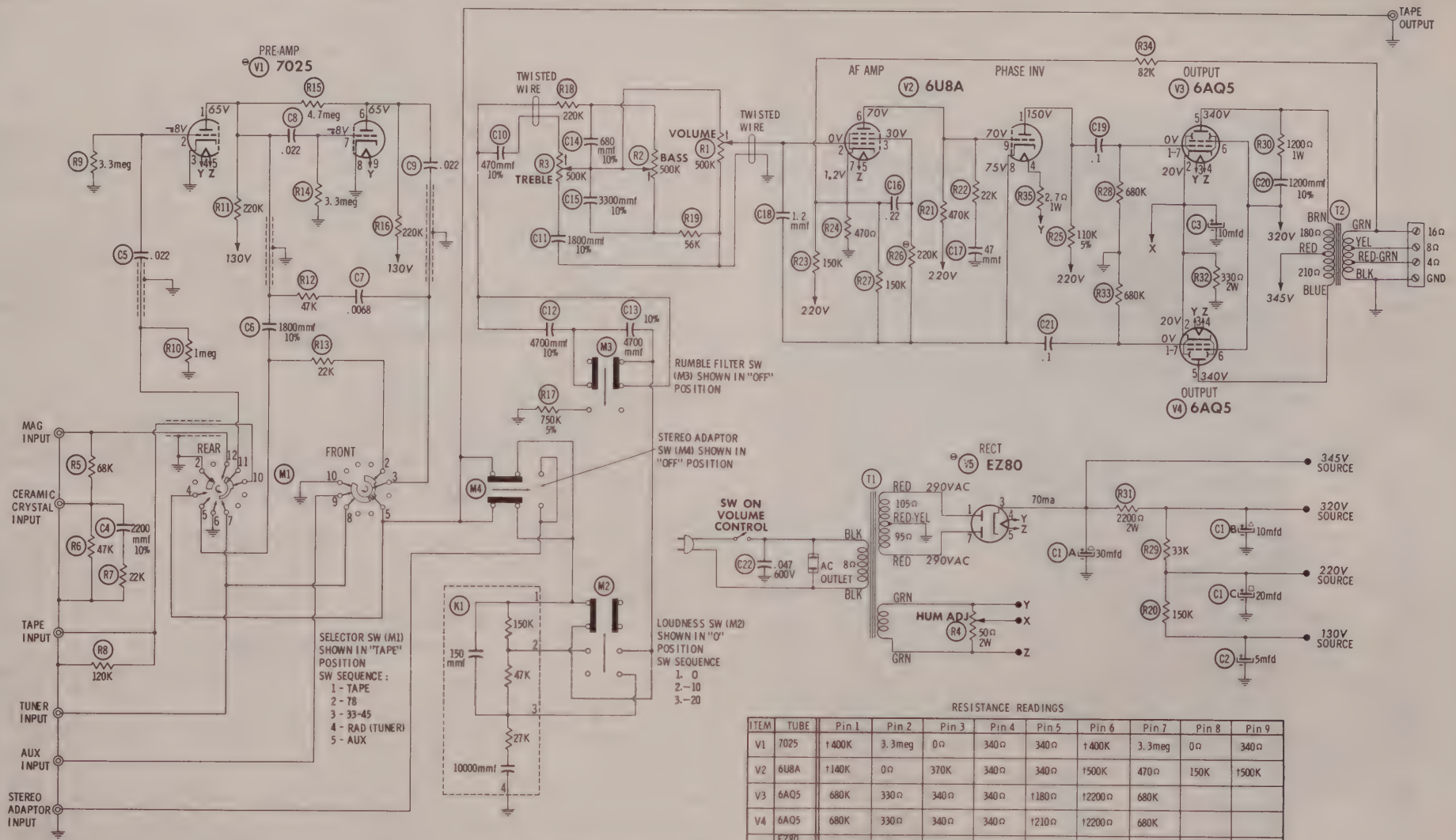
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†400K	3.3meg	0Ω	340Ω	340Ω	†400K	3.3meg	0Ω	340Ω
V2	6U8A	†140K	0Ω	370K	340Ω	340Ω	†500K	470Ω	150K	†500K
V3	6AQ5	680K	330Ω	340Ω	340Ω	†180Ω	†2200Ω	680K		
V4	6AQ5	680K	330Ω	340Ω	340Ω	†210Ω	†2200Ω	680K		
V5	EZ80 6V4	105Ω	NC	¶	340Ω	340Ω	NC	95Ω	NC	NC

RESISTANCE READINGS

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 3 OF V5.
NC NO CONNECTION.

❸ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CHALLENGER MODEL AC10

PHOTOFACT* Folder

FIRESTONE MODEL
4-C-36 (Code 1-8-5TR)

TRADE NAME	Firestone Model 4-C-36 (Code 1-8-5TR)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
RATING	23MA@9 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A4, A5..... GENERAL CEMENT #5000, 5003, 5004, 5008, 5009, 5066, 8195, 8277, 8290, 8607, 8821, 9105, 9106, 9291
WALSCO #2515, 2520, 2522, 2523, 2534, 2537, 2538
A6..... GENERAL CEMENT #8606, 8606L, 9087, 9089, 9091
WALSCO #2541, 2543, 2544

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side thru .1mfd to converter base (X1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3	Adjust for maximum output.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A5	"
4.		"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang.

DISASSEMBLY

1. Lift handle and remove 2 screws from side of case. Remove cover.
2. Remove screw from right corner of speaker.
3. Remove nut holding earphone jack.
4. Remove chassis.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H908

SET 436 FOLDER 6

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411	Converter		2N411	2N486	2N411	PNP
X2	2N409	1st IF Amplifier		2N409	2N483	2N409	PNP
X3	2N409	2nd IF Amplifier		2N409	2N482	2N409	PNP
X4	R67*	Detector					
X5	2N405	Driver		2N405	2N362	2N405	PNP
X6	2N407	Output		2N407	2N631	2N407	PNP

* Some versions may use a 1N60 Crystal Diode in this application (Part #359004).

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	12	581014	SRE12V100	NL100-10	TT15X100	ML100-15		TE-1135
C2	10	12	581022	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128
C3	5	12	581025	XPP-12005	NL5-15	TT12X5	ML5-15		TE-1127
C4	10	12	581022	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128
C5	10	12	581022	XPP-12010	NL10-15	TT12X10	ML10-15		TE-1128
C6	50	7	581030	XPP-10050	NL50-10	TT10X50	ML50-15		TE-1119

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C7	20000		515011						
C8	20000		515011						
C9	20000		515011						
C10	4.7			NPO-DI 4.7	DTZ-4R7	C10V47C	ZT-5547	5TCCB-V47	10%
C11	20000		515011						
C12	20000		515011						
C13	4.7			NPO-DI 4.7	DTZ-4R7	C10V47C	ZT-5547	5TCCB-V47	10%
C14	20000		515011						
C15	20000		515011						
C16	20000		515011						①
C17	2000								
C18	20000		515011						

① Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000Ω	½	360411	B-11		Q13-114	U12	Volume
B	Switch			KB-1 or KR-1*		76-1	U8-26	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed

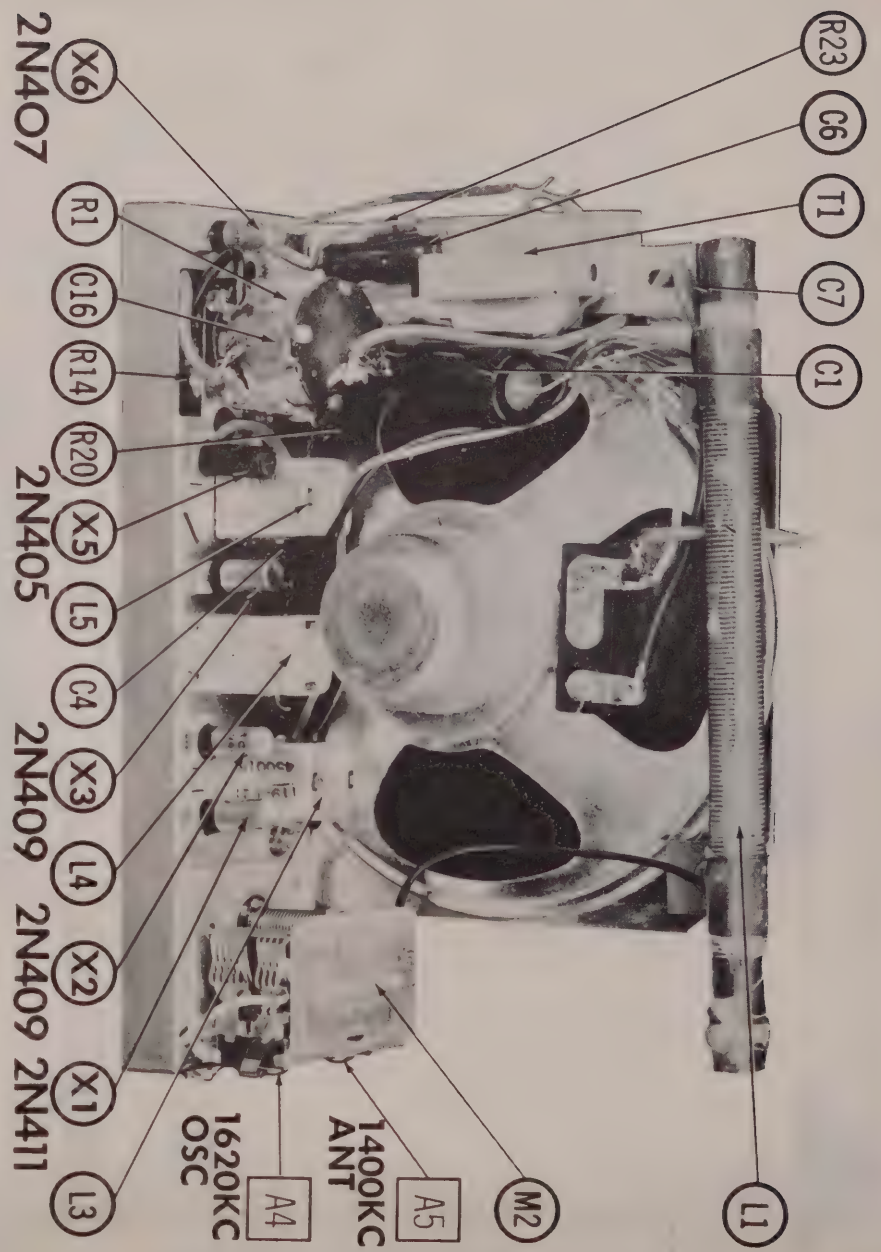
ITEM No.	RATING		FIRESTONE PART No.	NOTES
	OHMS	WATT		
R2	33K			Note 1
R3	18K			
R4	2200Ω			
R5	3900Ω			
R6	47Ω			
R7	4700Ω			
R8	270Ω			
R9	47K			
R10	18K			
R11	2200Ω			
R12	2200Ω			

Note 1. Not used in some versions.

ITEM No.	RATING		FIRESTONE PART No.	NOTES
	OHMS	WATT		
R13	100K			Note 2
R14	3300Ω			
R15	1meg			
R16	10K			
R17	68K			
R18	3900Ω			
R19	1000Ω			
R20	100Ω			
R21	1500Ω			
R22	4700Ω			
R23	100Ω			

Note 2. Not used when X4 is a 1N60 crystal.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		FIRESTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loopstick	464022					
L2	Osc. Coil	455062					
L3	1st IF Trans.	450018	16-9014				
L4	2nd IF Trans.	450018	16-9014				
L5	3rd IF Trans.	450019	16-9014				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	700Ω	3-4Ω	430410	GH6 ①			TA-43 ①		TY-45X①	① Use original channel frame

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	404014	4A07	

BATTERIES

ITEM No.	VOLTAGE	FIRESTONE PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			Z ①		1015 ① E9 ①②		M15R ① ZM9①②	① 6 Used ② Mercury Type

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M2	Tuning Cap.	590043	2 Gang, Ant. 6-127mmf, Osc. 7-83mmf

CABINETS & CABINET PARTS

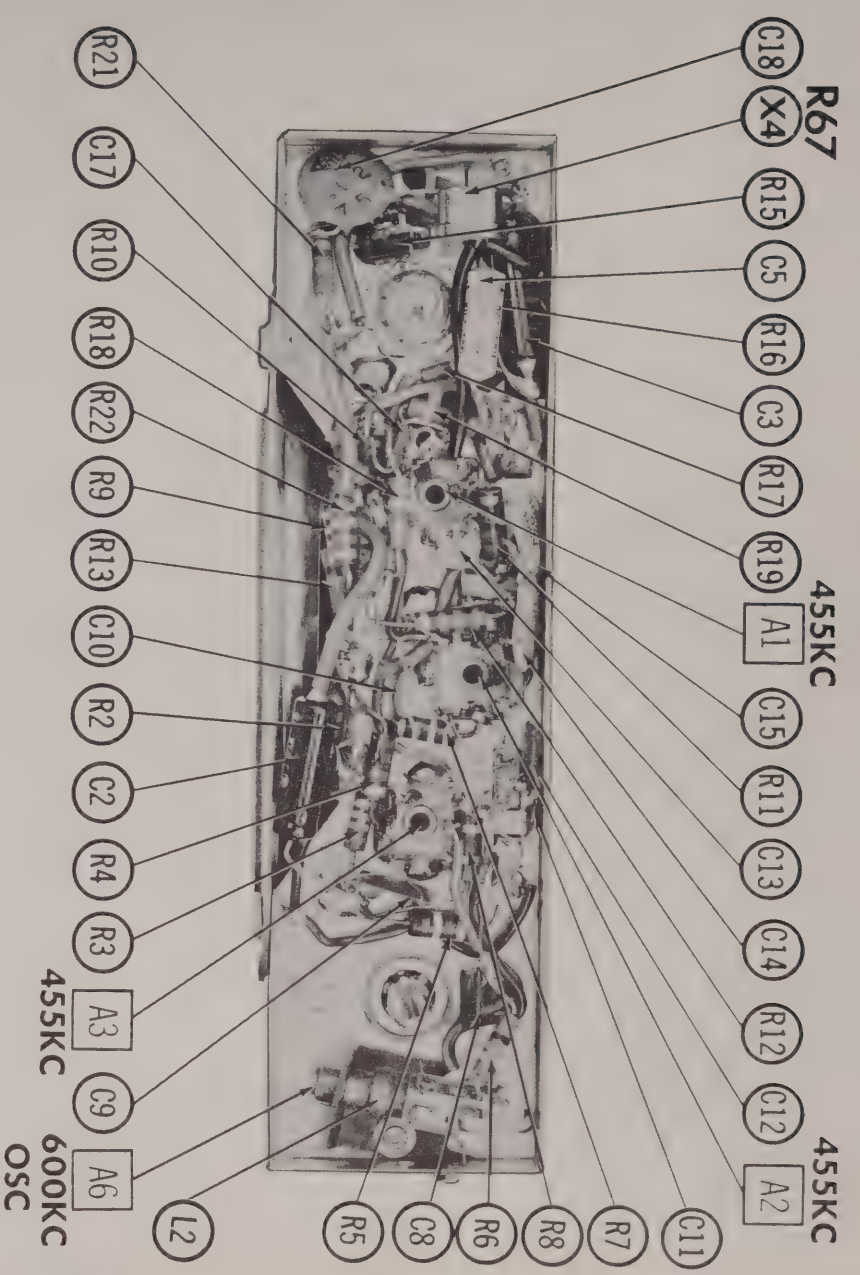
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

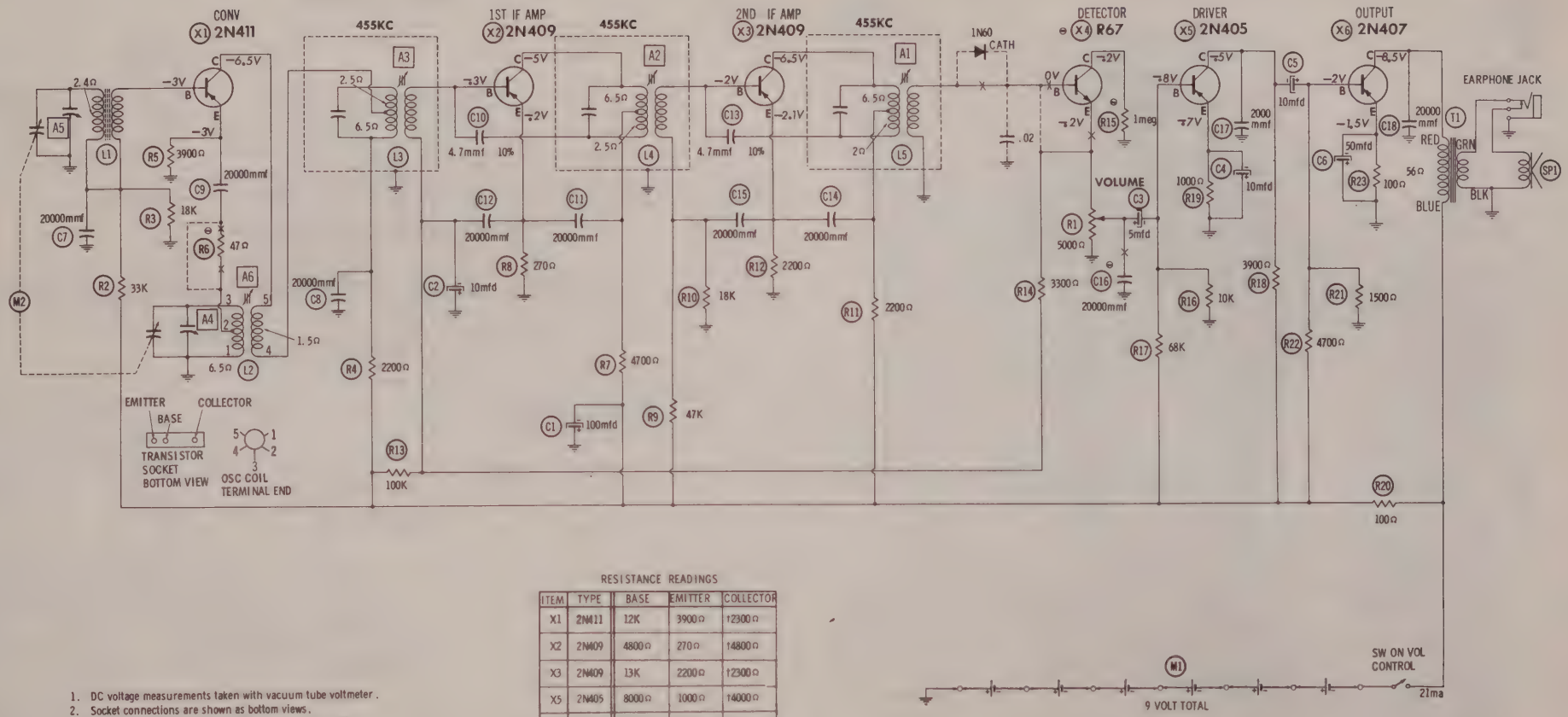
NAME	PART NO.	DESCRIPTION
Knob	272338	Tuning
Knob	272237	Off-On-Volume
Case	250170	White, Less Cover and Handle
Case	250172	Black, Less Cover and Handle
Back Cover	250171	White
Back Cover	250173	Black
Handle	790086	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	12K	3900Ω	†2300Ω
X2	2N409	4800Ω	270Ω	†4800Ω
X3	2N409	13K	2200Ω	†2300Ω
X5	2N405	8000Ω	1000Ω	†4000Ω
X6	2N407	1500Ω	100Ω	†56Ω

CIRCUIT RESISTANCE OF X4 NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS
† MEASURED FROM JUNCTION OF R20 AND T1.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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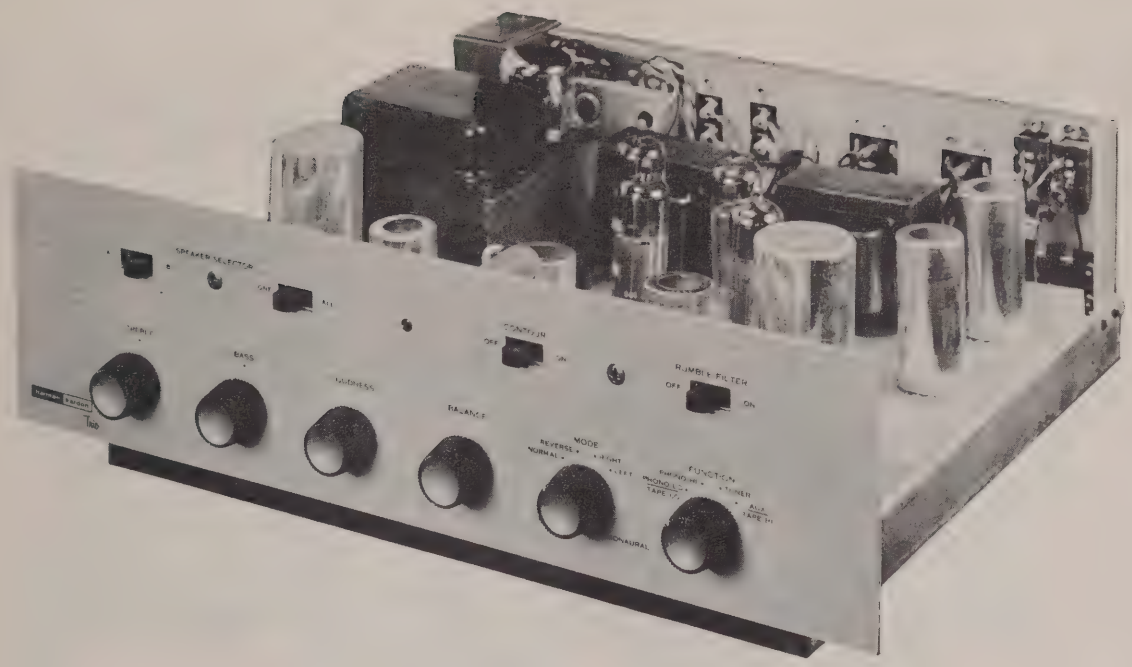
FIRESTONE MODEL 4-C-36 (Code 1-8-5TR)

PHOTOFACT* Folder

HARMAN-KARDON
MODEL A-224



HARMAN-KARDON
MODEL A-224

TRADE NAME	Harman-Kardon Model A-224 "The Trio"
MANUFACTURER	Harman-Kardon, Inc., 520 Main Street, Westbury, L. I., N. Y.
TYPE SET	AC Operated Stereo Amplifier
TUBES	Ten
POWER SUPPLY	105-125 Volts AC, 60 Cycles RATING 105 Watts, 1.05 Amp. @117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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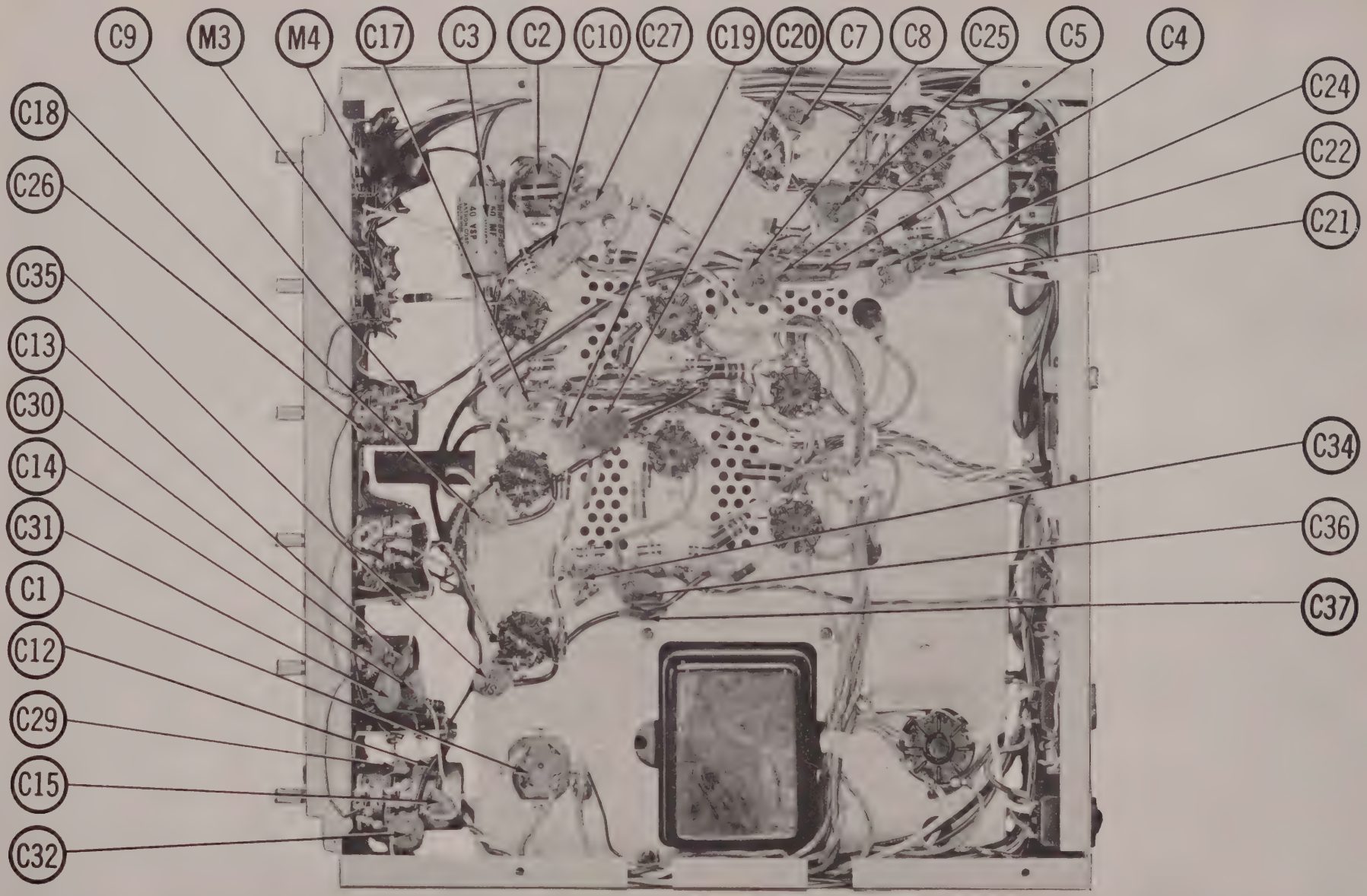
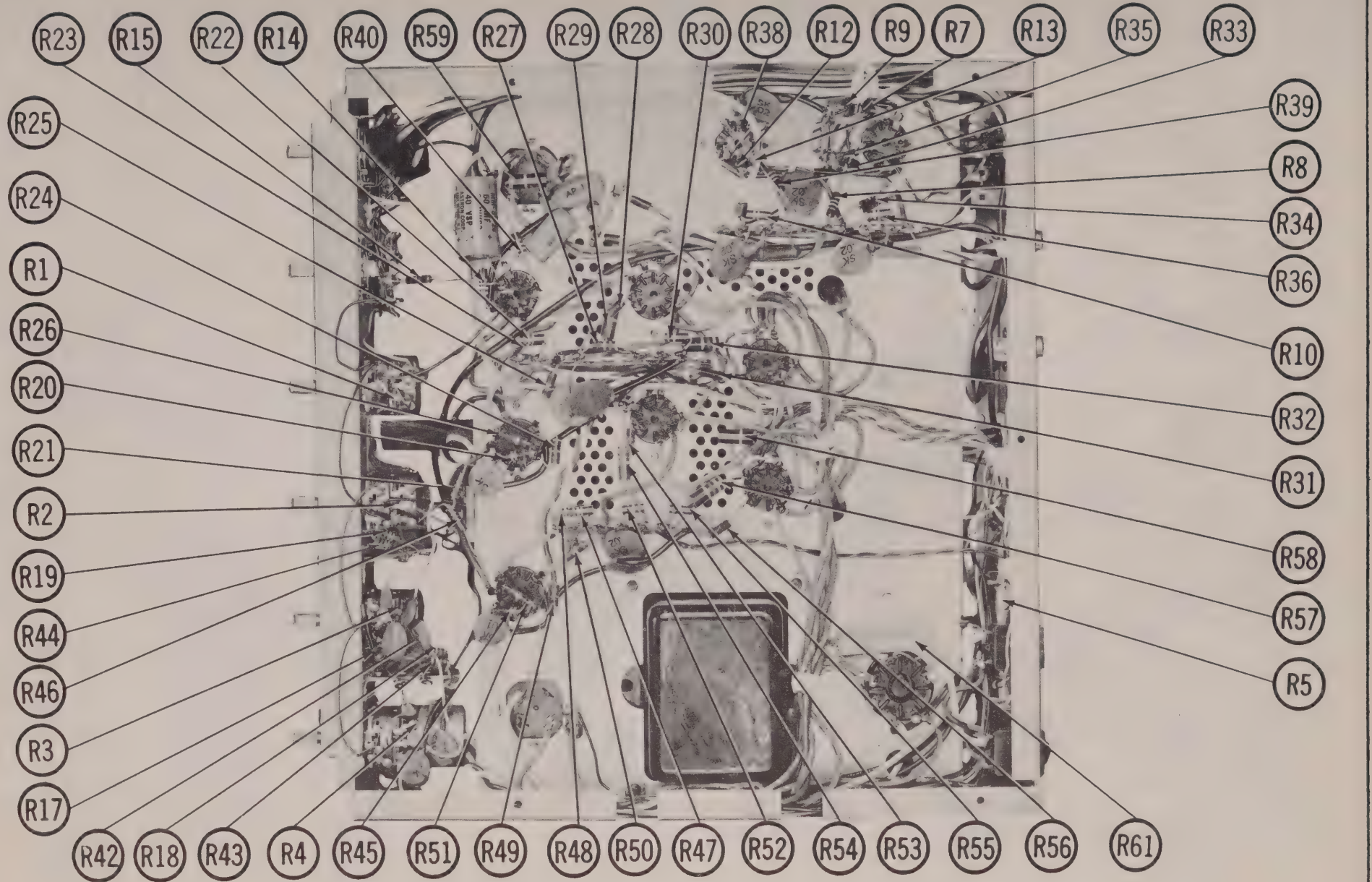
H903

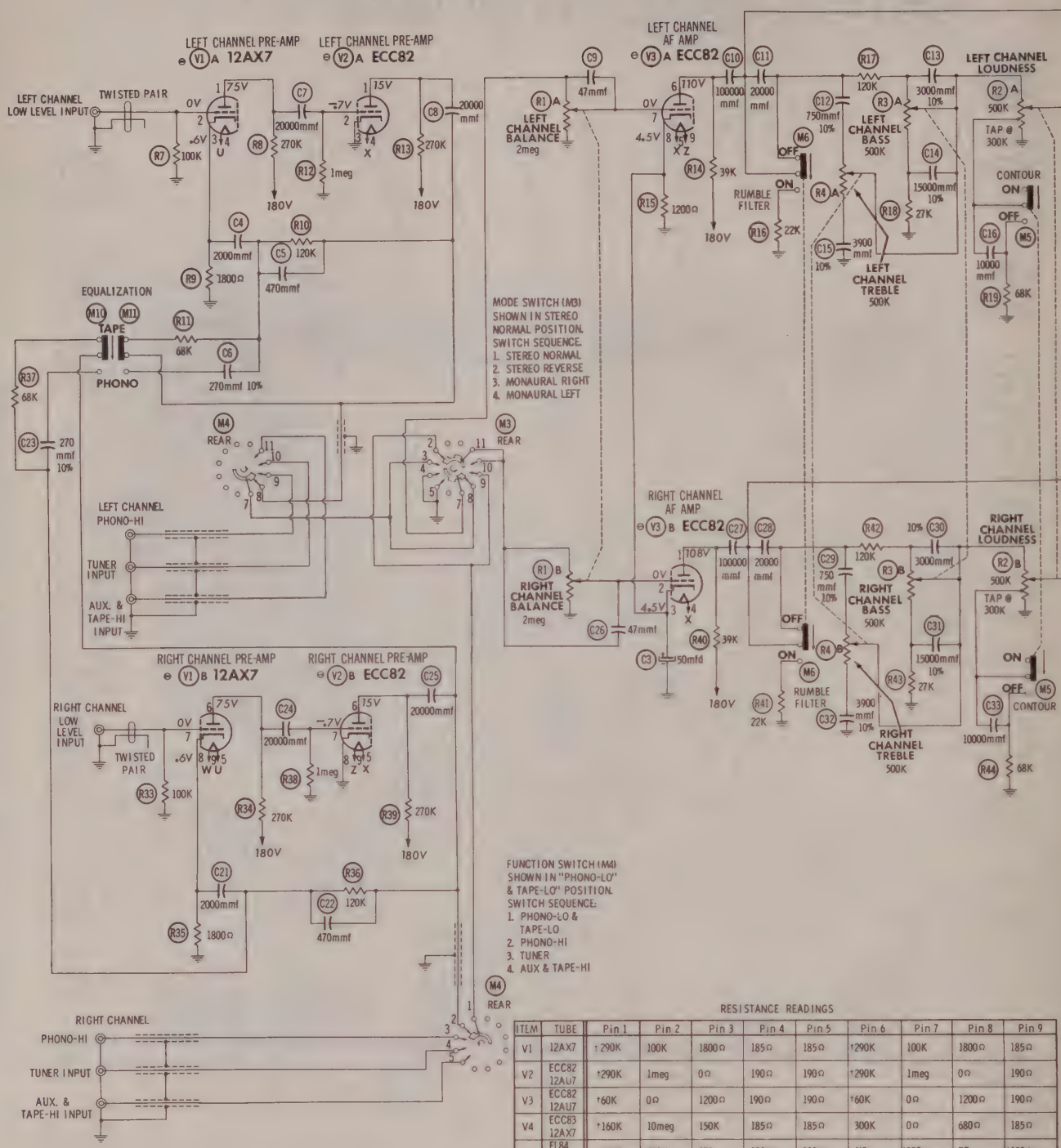
SET 436 FOLDER 7



CHASSIS BOTTOM VIEW - CAPACITOR & MISC. IDENT.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†290K	100K	1800Ω	185Ω	185Ω	†290K	100K	1800Ω	185Ω
V2	ECC82 12AU7	†290K	1meg	0Ω	190Ω	190Ω	†290K	1meg	0Ω	190Ω
V3	ECC82 12AU7	†60K	0Ω	1200Ω	190Ω	190Ω	†60K	0Ω	1200Ω	190Ω
V4	ECC83 12AX7	†160K	10meg	150K	185Ω	185Ω	300K	0Ω	680Ω	185Ω
V5	EL84 6BQ5	470K	470K	170Ω	190Ω	190Ω	NC	†330Ω	TP	†150Ω
V6	EL84 6BQ5	470K	470K	170Ω	185Ω	185Ω	NC	†380Ω	TP	†150Ω
V7	ECC83 12AX7	†160K	10meg	150K	185Ω	185Ω	300K	0Ω	680Ω	185Ω
V8	EL84 6BQ5	470K	470K	170Ω	190Ω	190Ω	NC	†330Ω	TP	†150Ω
V9	EL84 6BQ5	470K	470K	170Ω	190Ω	190Ω	NC	†380Ω	NC	†150Ω
V10	GZ34 5AR4	TP	¶	NC	27Ω	TP	25Ω	TP	¶	

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 8 OF V10.
■ MEASURED FROM PIN 3 OF V4.
▲ MEASURED FROM PIN 8 OF V4.
• MEASURED FROM PIN 3 OF V7.
▪ MEASURED FROM PIN 8 OF V7.
NC NO CONNECTION
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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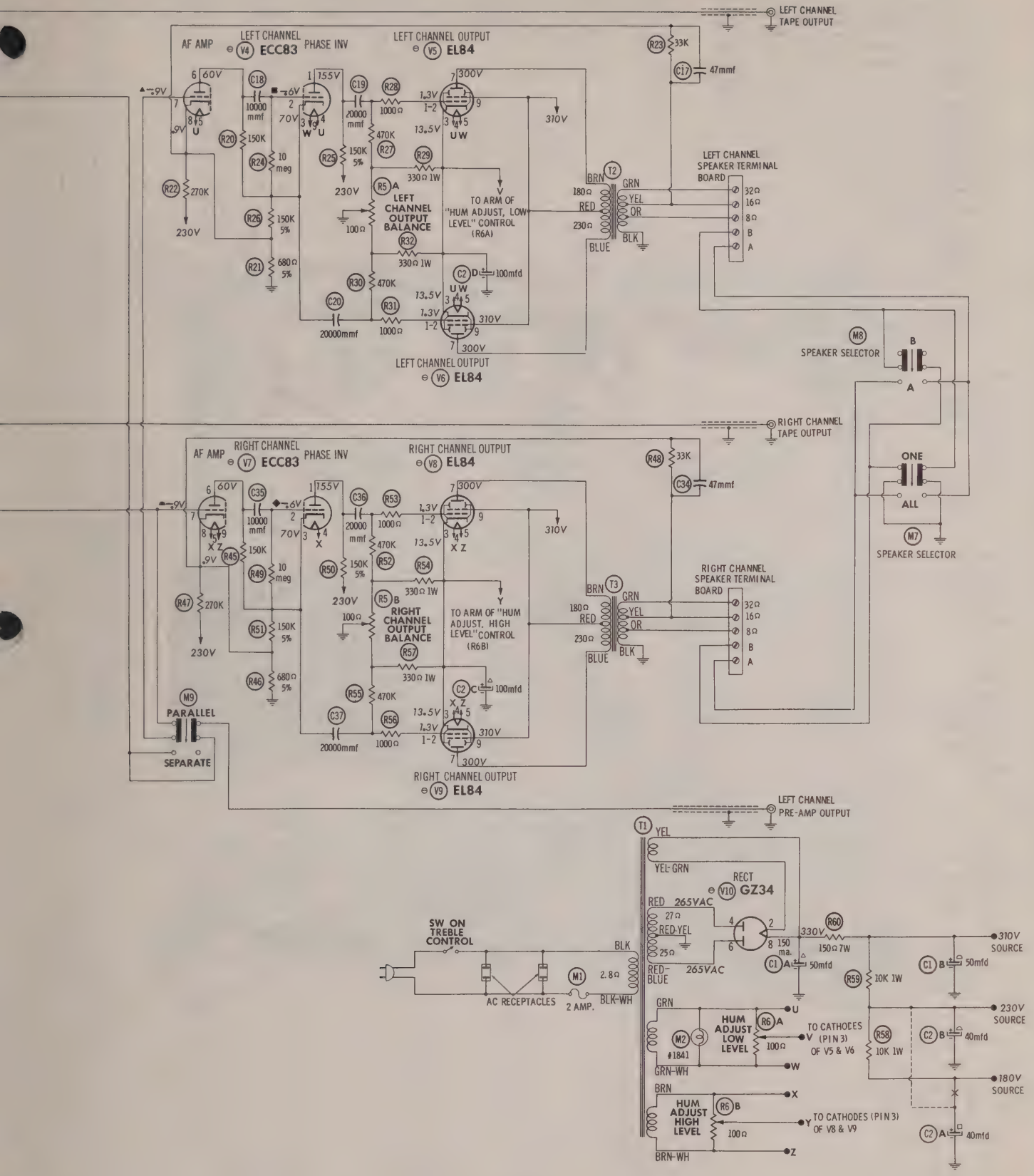
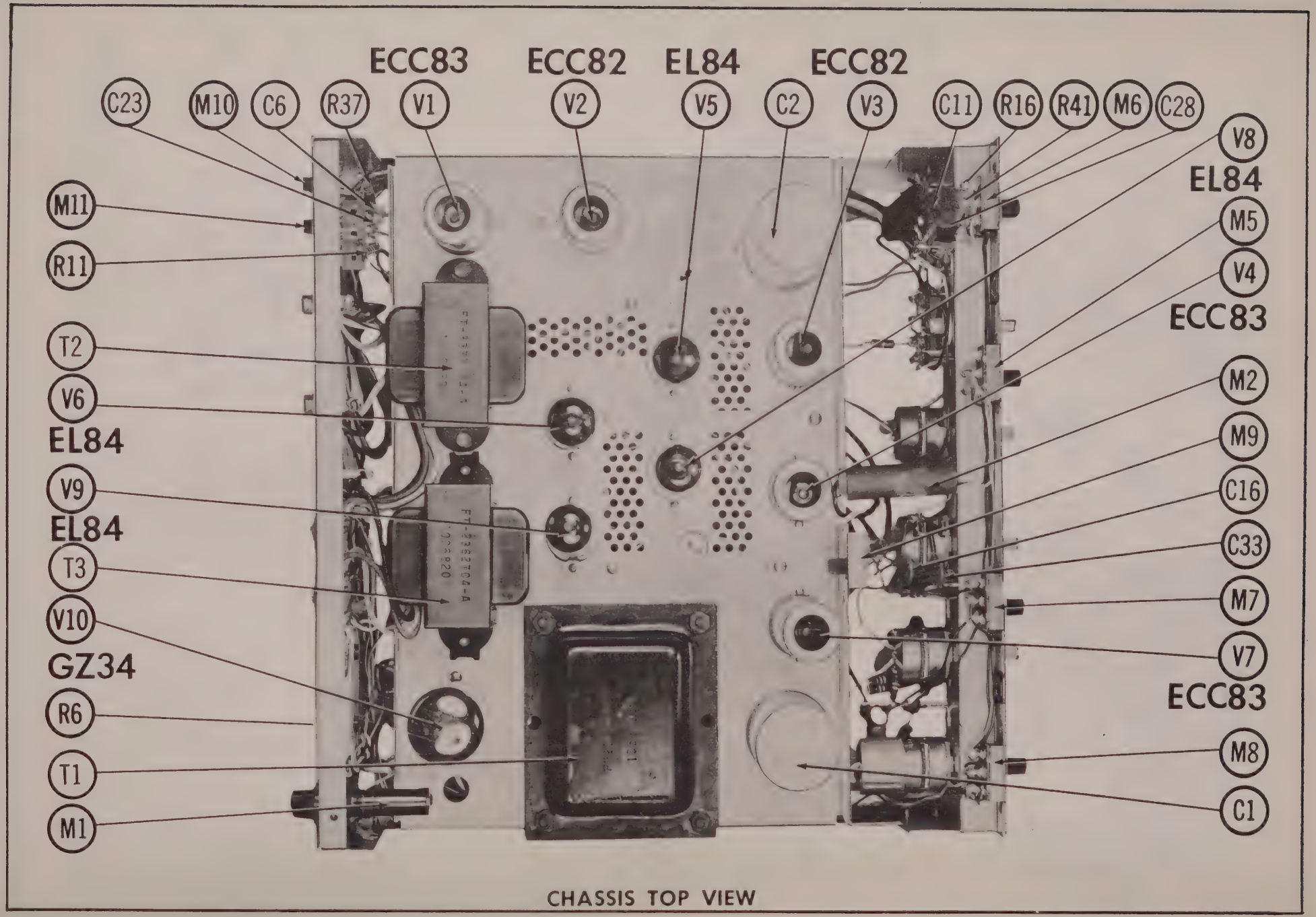


HARMAN-KARDON
MODEL A-224



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Left Ch. Preamplifier-Right Ch. Preamplifier	12AX7/ECC83 ①
V2	Left Ch. Preamplifier-Right Ch. Preamplifier	ECC82/12AU7 ①
V3	Left Ch. AF Amplifier-Right Ch. AF Amplifier	ECC82/12AU7 ①
V4	Left Ch. AF Amp.-Phase Inv.	ECC83/12AX7 ①
V5	Left Ch. Output	EL84/6BQ5 ①
V6	Left Ch. Output	EL84/6BQ5 ①
V7	Right Ch. AF Amp.-Phase Inv.	ECC83/12AX7 ①
V8	Right Ch. Output	EL84/6BQ5 ①
V9	Right Ch. Output	EL84/6BQ5 ①
V10	Rectifier	GZ34/5AR4 ①

① Domestic type listed may not be directly interchangeable in some instances.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲50	400	JE2362694	AFH2-58	XB0455	FP240	TMQ-7	Q-046 MT-4520	TVL-2767
B	▲50	400							
C2A	▲40	300	JE2362695		C0870	FP423.4		Q-220.5	TVLS-4560.5*
B	▲40	300			BBR100-25	TC77		MT-02100	
C	▲100	25							
D	100	25							
C3	50	25	JE2362786	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	2000			SI 2000	D6-202	LT6D2	UC-522	5HK-D2	
C5	470			SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C6	270				MD-271	L10T27		5TCC-T27	10%
C7	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C8	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C9	47			BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C10	100000				DF-104				
C11	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C12	750						JL-375		10%
C13	3000								10%
C14	15000								10%
C15	3900						JL-239		10%
C16	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C17	47			BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C18	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C19	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C20	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C21	2000			SI 2000	D6-202	LT6D2	UC-522	5HK-D22	
C22	470			SI 470	D6-471	LT6T47	UC-5347	5GA-T47	
C23	270				MD-271	L10T27		5TCC-T27	10%
C24	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C25	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C26	47			BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C27	100000				DF-104				
C28	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C29	750						JL-375		10%
C30	3000								10%
C31	15000								10%
C32	3900						JL-239		10%
C33	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C34	47			BPD-000047	DD-470	L10Q47	CNO-447	5GA-Q47	
C35	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C36	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C37	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	RV2362696	BB-110	AD47-2meg-S	Q11-139		Balance (Left)
B	2meg	½		Not Req.	Not Req.	M11-139		Balance (Right)
C	Shaft			Not Req.	KSS-3	Not Req.		
R2A	500K	½	RV2362729					Loudness, Tap ⓐ 300K(Left)
B	500K	½						Loudness, Tap ⓐ 300K(Right)
R3A	500K	½	RV2362697	BB-104	AD47-500K-Z	Q13-133		Bass
B	500K	½		Not Req.	Not Req.	M13-133		Bass
C	Shaft			Not Req.	KSS-3	Not Req.		
R4A	500K	½	RV2362730		AD47-500K-Z	Q13-133		Treble
B	500K	½			Not Req.	M13-133		Treble
C	Shaft				KSS-3	Not Req.		
D	Switch				SWE-12	76-1		
R5A	100Ω	½	RV2362690				U1 †	Output Balance (Left)
B	100Ω	½					U1 †	Output Balance (Right)
R6A	100Ω	½	RV2362690				U1 †	Hum Adjust, Low Level
B	100Ω	½					U1 †	Hum Adjust, High Level

† Enlarge mounting hole to 3/8"

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Harman-Kardon PART No.	NOTES
R7	100K			
R8	270K			
R9	1800Ω			
R10	120K			
R11	68K			
R12	1meg			
R13	270K			
R14	39K			
R15	1200Ω			
R16	22K			
R17	120K			
R18	27K			
R19	68K			
R20	150K			
R21	680Ω 5%			
R22	270K			
R23	33K			
R24	10meg			
R25	150K 5%			
R26	150K 5%			
R27	470K			
R28	1000Ω			
R29	330Ω	1		
R30	470K			
R31	1000Ω			
R32	330Ω	1		
R33	100K			

ITEM No.	RATING OHMS	RATING WATT	Harman-Kardon PART No.	NOTES
R34	270K			
R35	1800Ω			
R36	120K			
R37	68K			
R38	1meg			
R39	270K			
R40	39K			
R41	22K			
R42	120K			
R43	27K			
R44	68K			
R45	150K			
R46	680Ω 5%			
R47	270K			
R48	33K			
R49	10meg			
R50	150K 5%			
R51	150K 5%			
R52	470K			
R53	1000Ω			
R54	330Ω	1		
R55	470K			
R56	1000Ω			
R57	330Ω	1		
R58	10K	1		
R59	10K	1		
R60	150Ω	7		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ 1.01A	540 VCT ⓐ .150A	5V ⓐ 3A	FT2362705						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 2.2A	6.3V ⓐ 2.2A								

PARTS LIST & DESCRIPTION (continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6500Ω CT	32Ω Tap ⓐ 16Ω 8Ω	FT2362704	Z1011	A-2904 ①	AU-609	A-3870	24S55	S-55X	① Drill new mounting hole
T3	6500Ω CT	32Ω Tap ⓐ 16Ω 8Ω	FT2362704	Z1011	A-2904 ①	AU-609	A-3870	24S55	S-55X	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Harman-Kardon PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V			312002. (2A 250V)	342001	AGC 2	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M2	Lamp		#1841
M3	Switch	ER2362700	Mode, 4 Position (Rotary Wafer Type)
M4	Switch	ER2362701	Function, 4 Position (Rotary Wafer Type)
M5	Switch	ESCOM2727	Contour, DPDT (Slide Type)
M6	Switch	ESCOM2727	Rumble Filter, DPDT (Slide Type)
M7	Switch	ESCOM2727	Speaker Selector, One-All, DPDT (Slide Type)
M8	Switch	ESCOM2727	Speaker Selector, A-B, DPDT (Slide Type)
M9	Switch	ESCOM2727	Separate-Parallel, DPDT (Slide Type)
M10	Switch	ES771372	Equalization, SPDT (Slide Type)
M11	Switch	ES771372	Equalization, SPDT (Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	PCOM2840	6 Used

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder with CIRCUITRACE*

HOFFMAN MODELS BP706, EP706, KP706, PP706, RP706, TP706 (Ch. 1123)

HOFFMAN MODELS BP706, EP706, KP706, PP706, RP706, TP706 (Ch. 1123)

TRADE NAME	Hoffman Models BP706, EP706, KP706, PP706, RP706, TP706 (Ch. 1123)
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, California
TYPE SET	Battery Operated Portable Transistorized AM Receiver With Solar Power Pack
POWER SUPPLY	4 Volts DC
RATING	7.6 MA@4 Volts DC(No Signal, Min. Volume) 10 MA@4 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Suggested alignment tools:
A1, A2, A3, A4..... GENERAL CEMENT #5009, 8195, 8275, 8607, 8987, 9087, 9089, 9291
WALSCO #2523, 2534, 2537
A5, A6..... GENERAL CEMENT #5000, 5003, 5004, 5008, 5009, 5066, 8195, 8277, 8290, 8607, 8821, 9105, 9106, 9291
WALSCO #2515, 2520, 2522, 2523, 2534, 2537, 2538

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	High end of dial.	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	535KC	Tuning gang fully closed.	"	A4	"
3.		"	1620KC	High end of dial.	"	A5	Adjust for maximum output. Repeat steps 2 & 3.
4.		"	1400KC	Tune to 1400KC signal.	"	A6	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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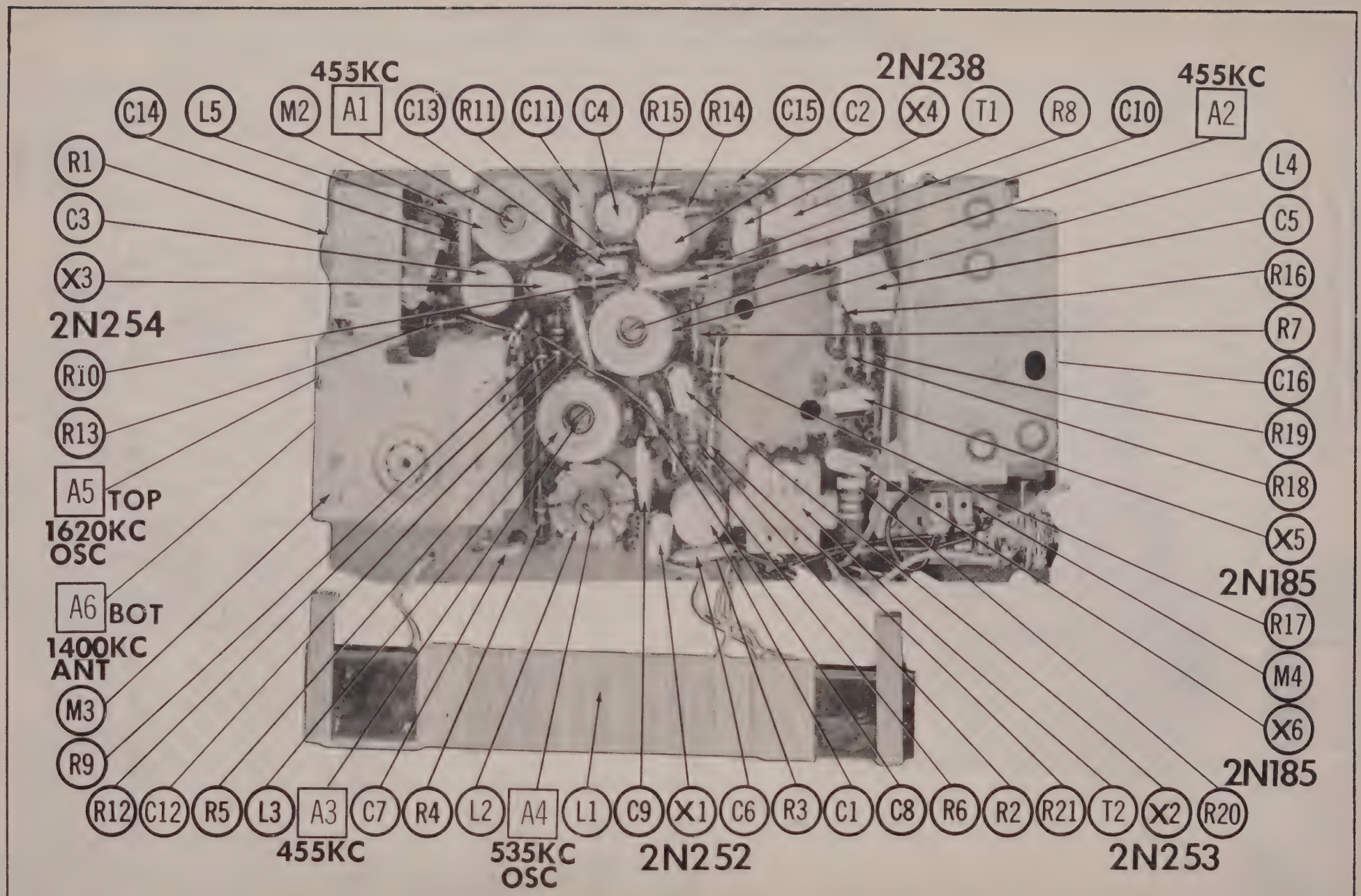
H909

SET 436 FOLDER 8



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N252	Converter			2N486	2N411	PNP
X2	2N253	1st IF Amplifier				2N94A	NPN
X3	2N254	2nd IF Amplifier				2N94A	NPN
X4	2N238	Driver		2N408	2N362	2N217	PNP
X5	2N185	Output		2N408	2N632	2N109	PNP Note 1
X6	2N185	Output		2N408	2N632	2N109	PNP Note 1

Note 1. X5 and X6 are a matched pair.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	6	856019						VL-1104
C2	50	6	856018	XPP-6050	NL50-6	TT6X50	ML50-6	MQ-650	VL-1094
C3	50	6	856018	XPP-6050	NL50-6	TT6X50	ML50-6	MQ-650	VL-1094
C4	10	6	856017	XPP-6010	NL10-6	TT6X10	ML10-6		VL-1087
C5	50	6	856018	XPP-6050	NL50-6	TT6X50	ML50-6	MQ-650	VL-1094

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	10000		851502					TG-S10	
C7	5000		851501					TG-D50	
C8	15		847210		DTZ-15				NPO 5%
C9	50000		851405					TG-S50	
C10	50000		851405					TG-S50	
C11	50000		851405					TG-S50	
C12	50000		851405					TG-S50	
C13	22		847209		DTZ-22				NPO 5%
C14	10000		851502					TG-S10	
C15	10000		851502					TG-S10	
C16	50000		851405					TG-S50	Note 1

Note 1. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	800041					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		HOFFMAN PART No.	NOTES
	OHMS	WATT		
R2	3300Ω		812198	
R3	12K		812205	
R4	2700Ω		812197	
R5	27K		812209	
R6	220Ω		812184	
R7	5600Ω		812201	
R8	1000Ω		812192	
R9	4700Ω		812200	
R10	5600Ω		812201	
R11	470Ω		812188	

ITEM No.	RATING		HOFFMAN PART No.	NOTES
	OHMS	WATT		
R12	330Ω		812186	
R13	3300Ω		812198	
R14	2200Ω		812196	
R15	5600Ω		812201	
R16	470Ω		812188	
R17	68Ω		812178	
R18	15K		812206	
R19	15K		812206	
R20	4.7Ω		815170	
R21	100Ω		812180	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		HOFFMAN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	924005					
L2	Osc. Coil	768013					
L3	1st IF	760020					
L4	2nd IF	760020					
L5	3rd IF	760021					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	: 1	726006	GH110		TA-28			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	200Ω CT	12Ω	724016							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	HOFFMAN PART No.	QUAM PART No.	
SP1	2 3/4"	PM	12Ω	708012		

BATTERIES

ITEM No.	VOLTAGE	HOFFMAN PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	4V	930003 ① 930304 ②		H-233		E233 ①		TR-233R①	① Mercury Type ② Solar Power Pack

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		HOFFMAN PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295	742002	1N64	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M3	Tuning Cap.	872010	2 Gang, Ant. 10.2-207.2mmf, Osc. 10.5-103.3mmf
M4	Switch	904004	Battery-Solar(SPST, Slide Type)
	Earphone	958005	
	Printed Board	560005	

PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	504002	Tuning
Knob	504003	Off-On-Volume
Knob	506022	Power Source Switch, Black
Knob	506024	Power Source Switch, Mocha
Knob	506025	Power Source Switch, Pink
Knob	506026	Power Source Switch, Red
Knob	506027	Power Source Switch, Turquoise
Knob	506028	Power Source Switch, Espresso
Knob	504005	Chrome, Battery Access Cover
Case Front	371028	Black
Case Front	371035	Mocha
Case Front	371036	Pink
Case Front	371037	Red
Case Front	371038	Turquoise
Case Front	371064	Espresso
Back Cover	371029	Black
Back Cover	371039	Mocha
Back Cover	371040	Pink
Back Cover	371041	Red
Back Cover	371042	Turquoise
Back Cover	371065	Espresso
Handle	288010	

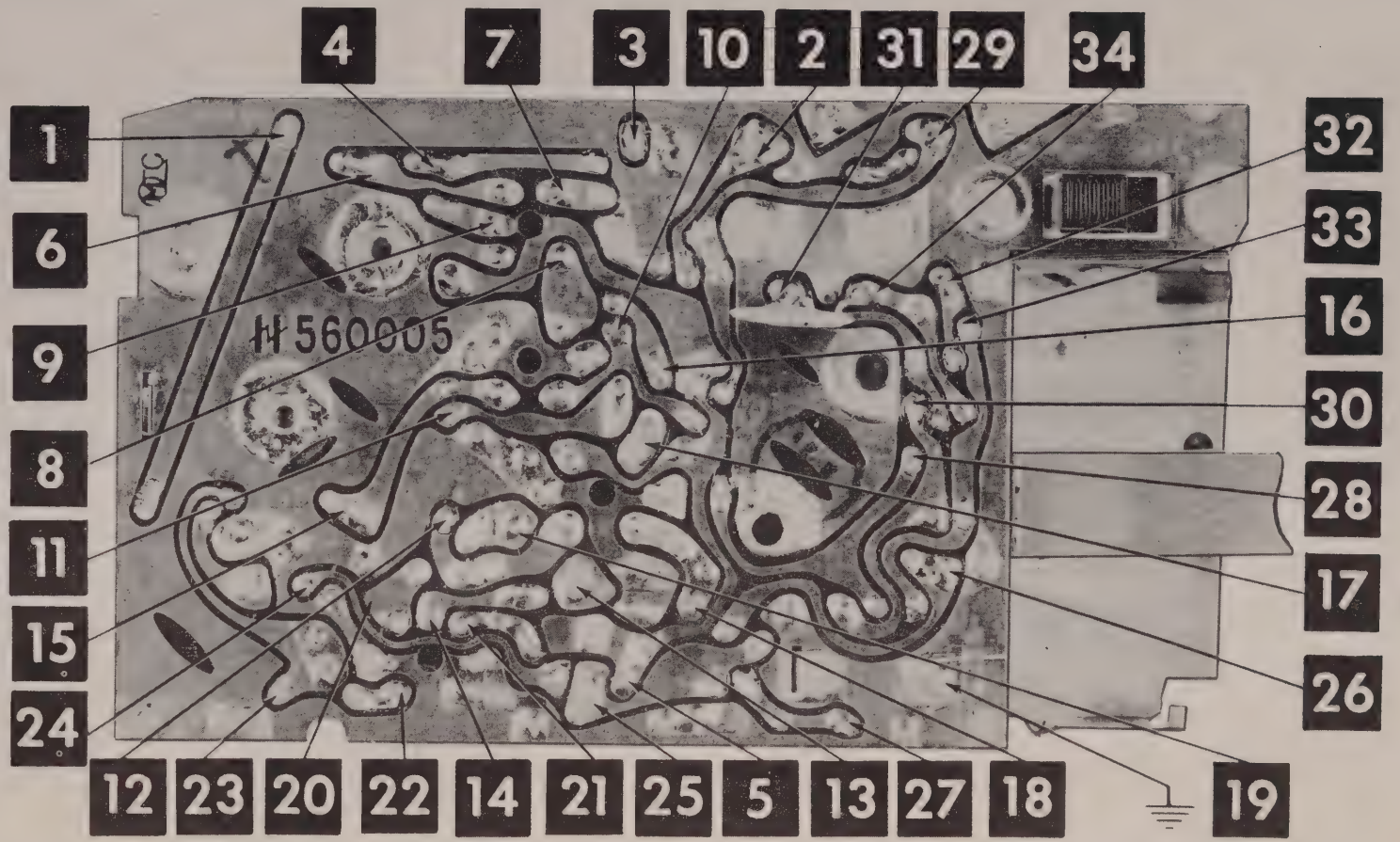
WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

DISASSEMBLY

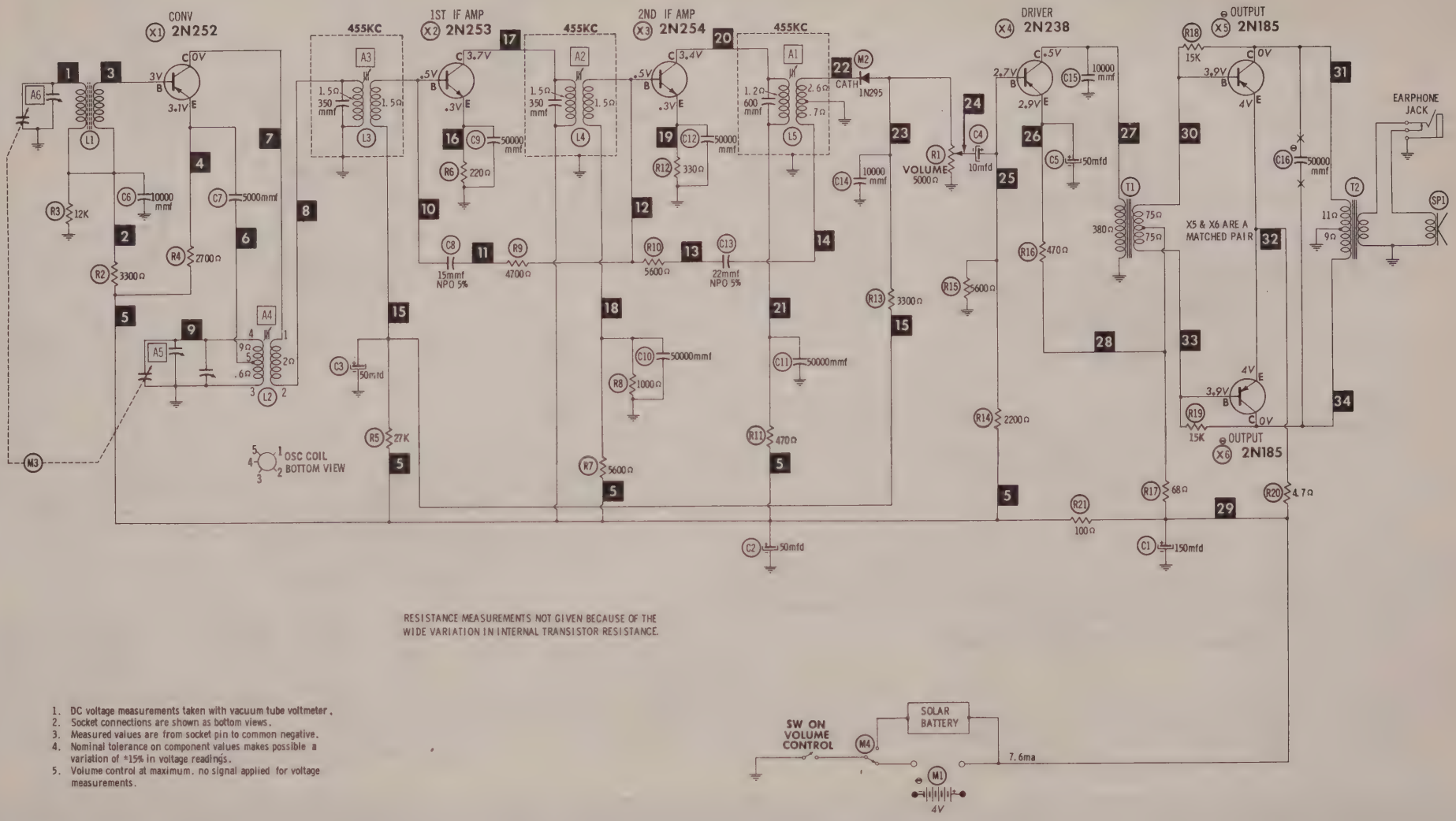
1. Remove screw from center of tuning knob.
2. Remove (pry) chrome plug located below tuning dial.
3. Remove dial calibration plate.
4. Remove two screws located behind plate.
5. Remove 4 corner screws from back cover. Remove cover.
6. Remove battery and Solar Power Pack.
7. Remove chassis mounting screw from battery compartment. Remove chassis.
8. Remove two screws from rear of speaker magnet. Remove speaker. (Note: these screws are the ground return for the speaker.)

(For access to tuning gang trimmers with chassis in case, the metal plate on the end of the case near the tuning gang may be rotated to expose the screws, front is oscillator; rear is antenna.)



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD



1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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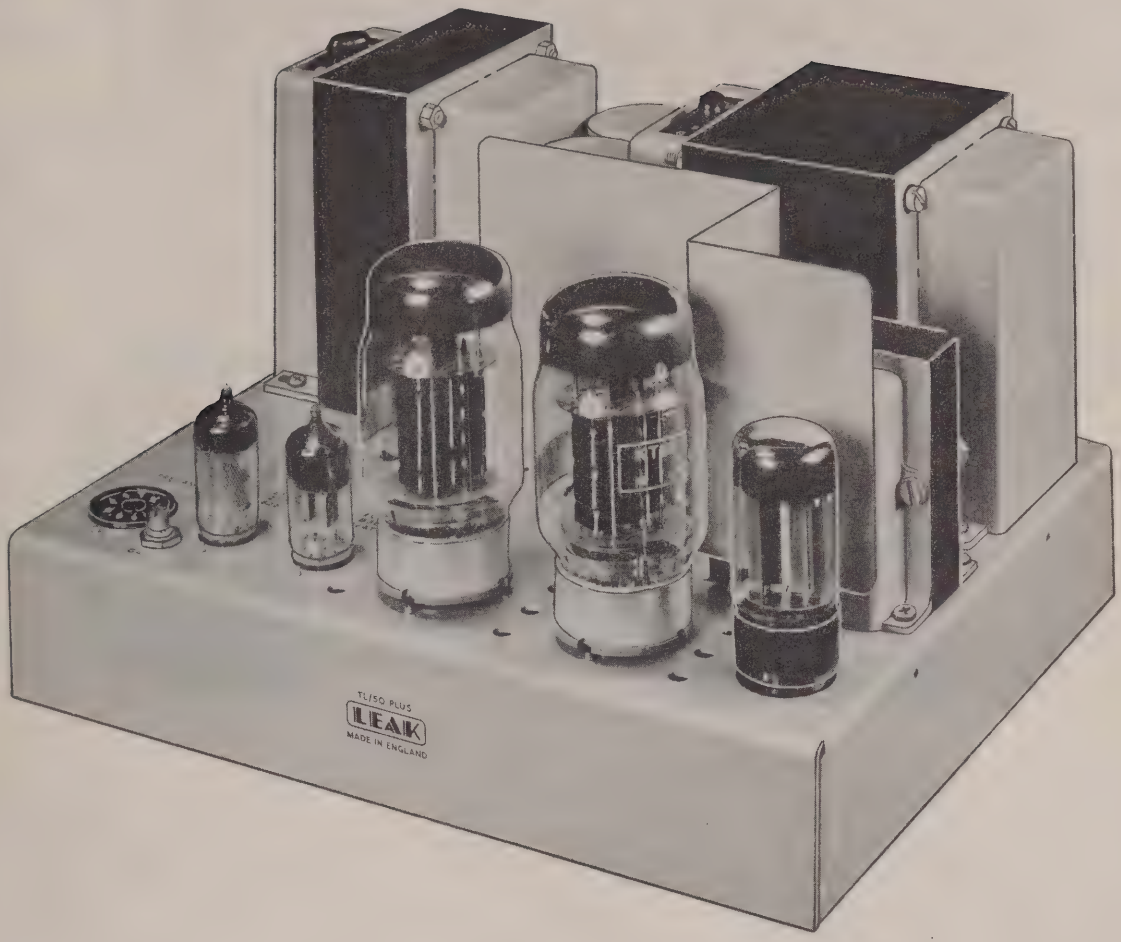
HOFFMAN MODELS BP706, EP706, KP706, PP706, RP706, TP706 (Ch. 1123)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

LEAK MODEL TL/50 Plus

LEAK MODEL
TL/50 Plus



LEAK MODEL
TL/50 Plus

TRADE NAME	Leak Model TL/50 Plus
IMPORTER	British Industries Corp., 80 Shore Road, Port Washington, N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Five)	Types EF86/6267 (or) Z729 AF Amplifier, ECC81/12AT7 (or) B309 AF Amp.-Phase Inv., (2) KT88/6550 Output, GZ34/5AR4 Rectifier
POWER SUPPLY	100/108/117/124 Volts AC-60 Cycles RATING 1.52 Amp. @ 117 Volts AC (155 Watts)

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amp.	EF86/ 6267①
V2	AF Amp. -Phase Inv.	ECC81/ 12AT7②

① Alternate type Z729

ITEM No.	USE	TYPE
V3	Output	KT88/ 6550
V4	Output	KT88/ 6550
V5	Rectifier	GZ34/ 5AR4

② Alternate type B309

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	LEAK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	32	600		PRS600V20	BRHV616				R2720 *
C2	32	600		PRS600V20	BRHV616				R2720 *
C3A	8	450		PRS450V168	BBRD16845		TDLD-25	MTD-308	R2174
B	16	450							
C4	1	350		PRS450V1	BR145			MMT-4501	R1260 *
C5	50	12		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C6	50	100		PRS150V50	BR5015	TC49	TD-50-150	MT-1550	TVA-1414
C7	50	100		PRS150V50	BR5015	TC49	TD-50-150	MT-1550	TVA-1414

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	LEAK PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	100			1469-0001	DTZ-100	22R5T1	MCE235	MS-31	5%
C9	.001	400		P488N-001	D6-102	CUB6D1	GEM-421	6TM-D1	
C10	.25	350		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C11	.1	350		P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C12	.25	350		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C13	.25	350		P488N-25		CUB4P25	GEM-4025	4TM-P25	
C14	50			1469-00005	DTZ-50	22R5Q5	MCE225	MS-45	5%

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	LEAK PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	250K	½						Gain

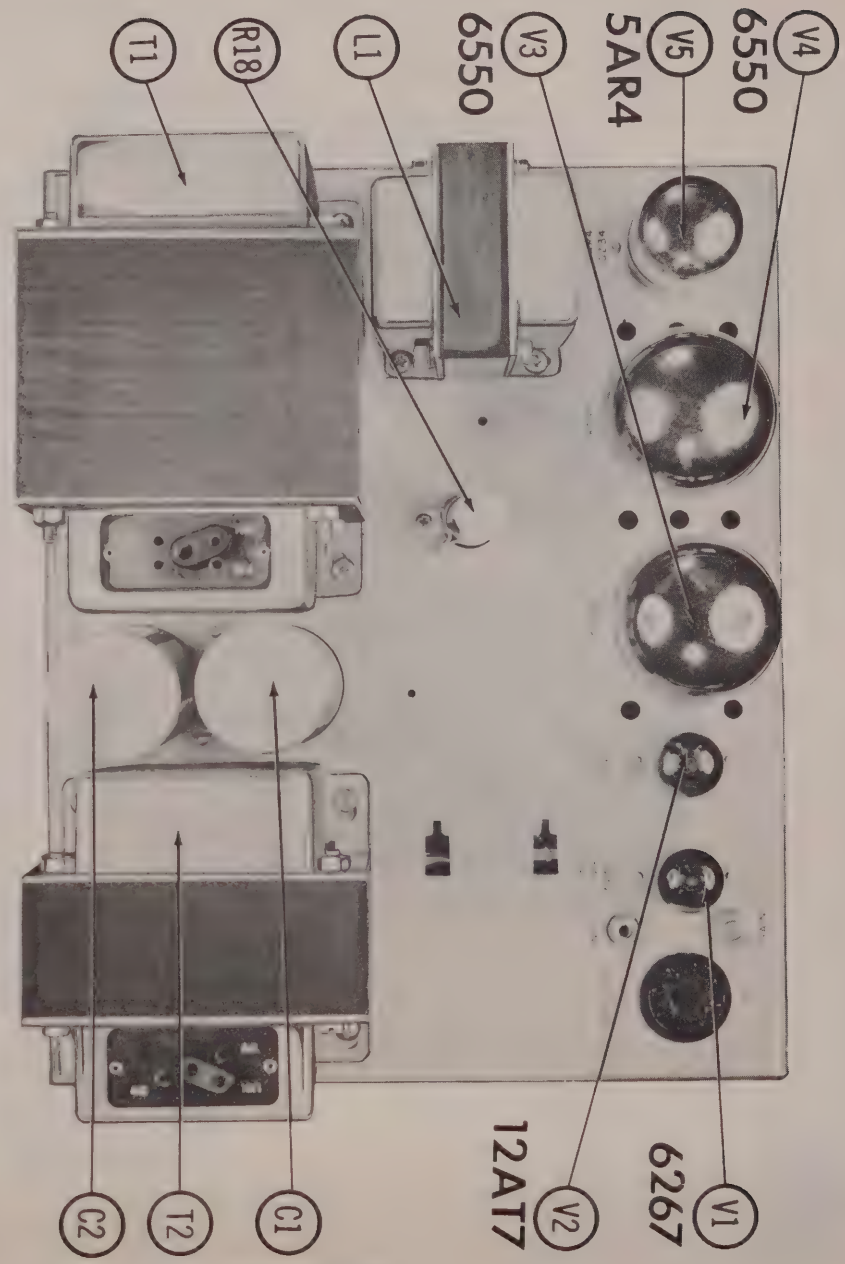
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		LEAK PART No.	NOTES
	OHMS	WATT		
R2	22K			
R3	270K			
R4	1.5meg			
R5	100K	1		
R6	2200Ω			
R7	100Ω			
R8	27K			
R9	3.3meg			
R10	91K 5%	1		
R11	1000Ω			

ITEM No.	RATING		LEAK PART No.	NOTES
	OHMS	WATT		
R12	22K	1		
R13	3.3meg			
R14	100K 5%	1		
R15	22K	1		
R16	10K			
R17	330K			
R18A	600Ω	>10		
B	600Ω			
R19	10K			
R20	330K			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	LEAK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.180A	57Ω	2.75 Hy.		C5030①	C-2991①	F-803①	C-2325①	20C49①	C-15A①

① Drill new mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	LEAK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	124V Taps ⓐ 117V ⓐ 1.52A 108V, 100V	880VCT ⓐ .180A SEC. 3 6.3VCT ⓐ 3.8A	5V ⓐ 1.6A	8012						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	LEAK PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5000Ω CT With Screen Taps ⓐ 1400Ω CT	16Ω Taps ⓐ 8Ω 4Ω	8013						S-146 A ① ②	① Drill new mounting holes ② Does not have built in impedance switch

FUSES

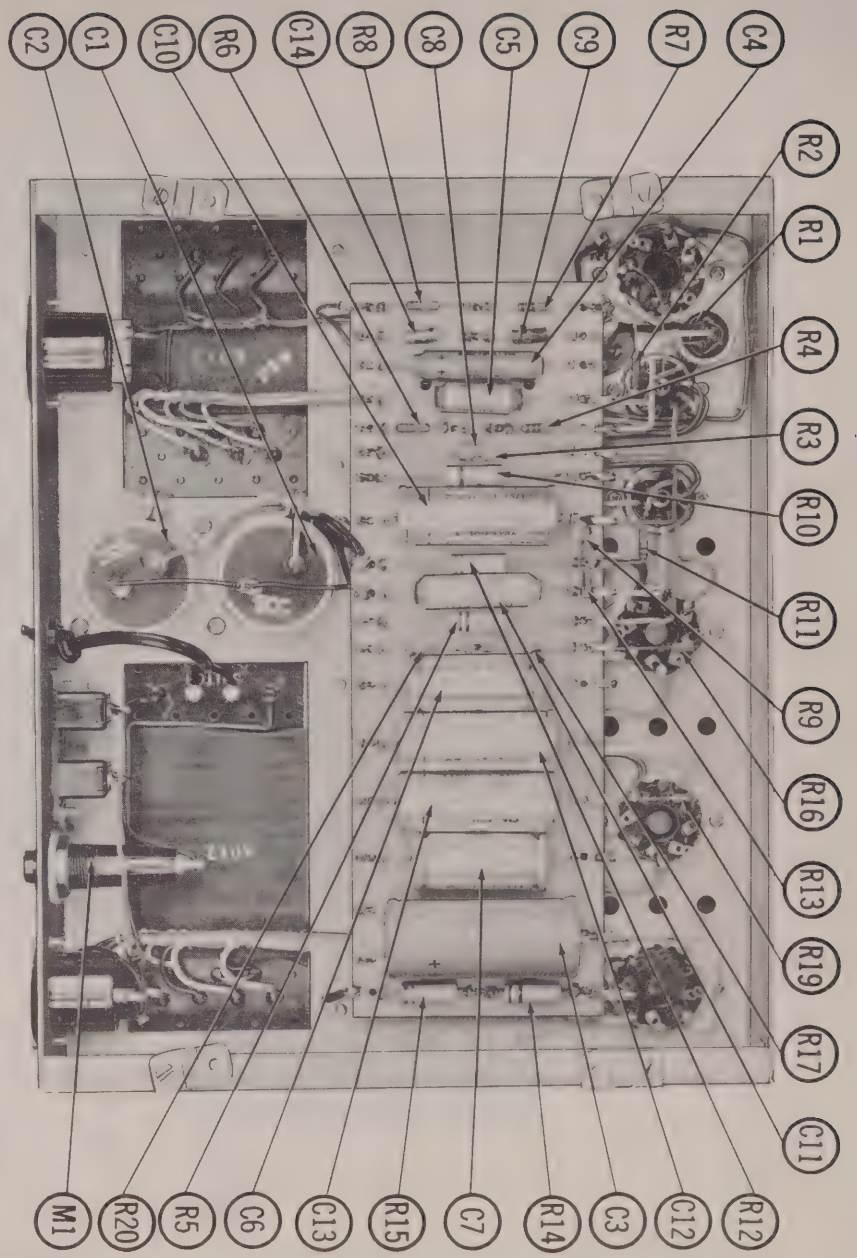
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			LEAK PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	5A 250V			312005. (5A 250V)	341001	MTH5	HKP

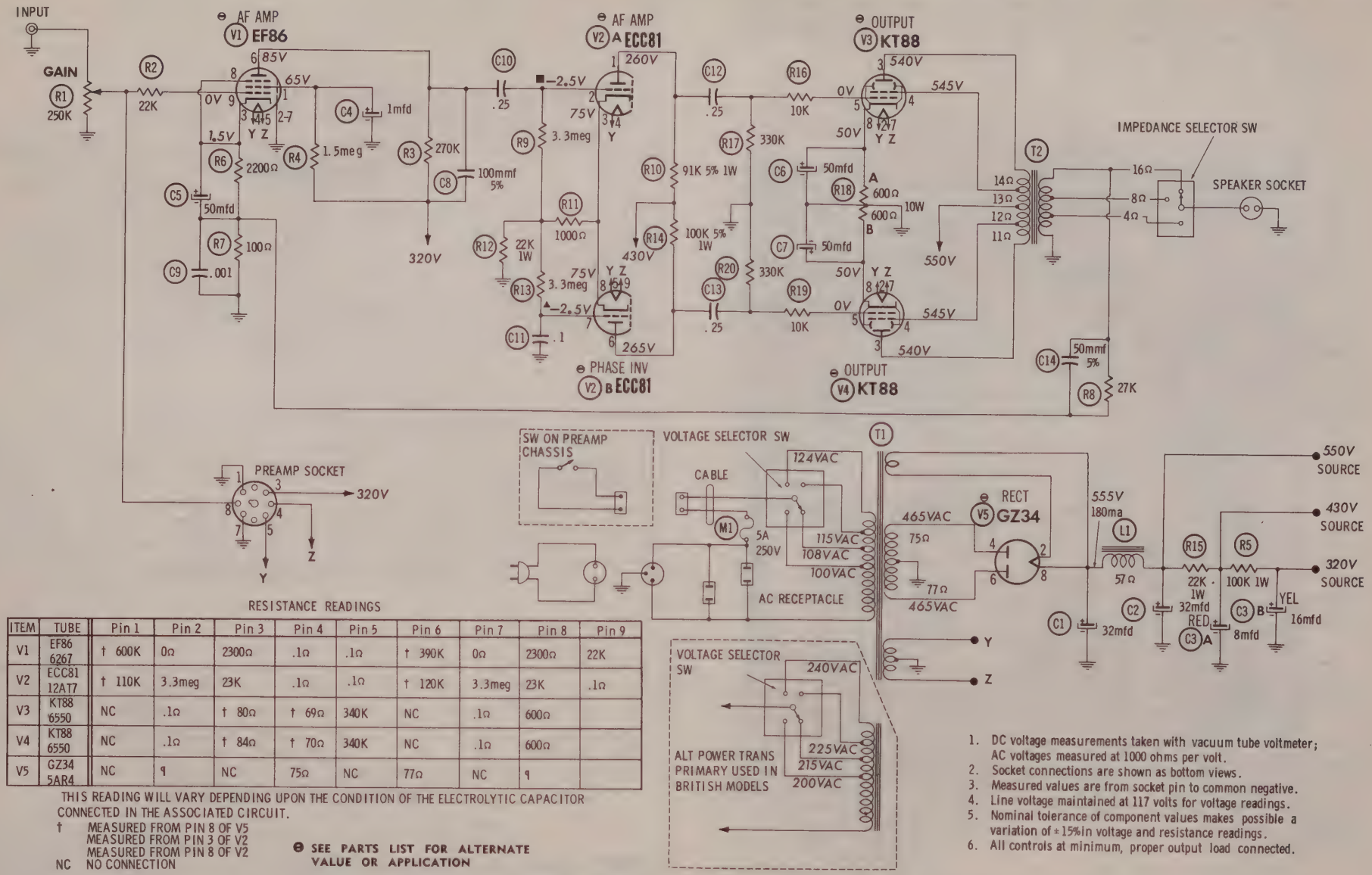
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	EF86 6267	† 600K	0Ω	2300Ω	.1Ω	.1Ω	† 390K	0Ω	2300Ω	22K
V2	ECC81 12AT7	† 110K	3.3meg	23K	.1Ω	.1Ω	† 120K	3.3meg	23K	.1Ω
V3	KT88 6550	NC	.1Ω	† 80Ω	† 69Ω	340K	NC	.1Ω	600Ω	
V4	KT88 6550	NC	.1Ω	† 84Ω	† 70Ω	340K	NC	.1Ω	600Ω	
V5	GZ34 5AR4	NC	¶	NC	75Ω	NC	77Ω	NC	¶	

THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

† MEASURED FROM PIN 8 OF V5
MEASURED FROM PIN 3 OF V2
MEASURED FROM PIN 8 OF V2

NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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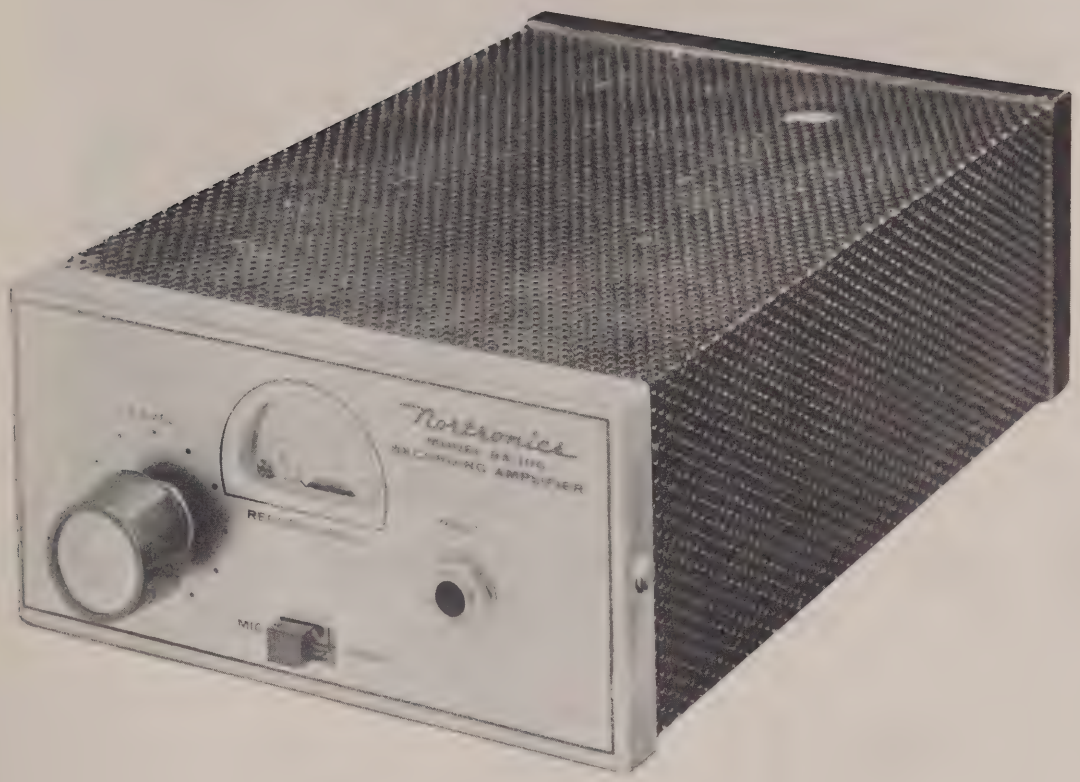
LEAK MODEL TL/50 Plus

PHOTOFACT* Folder

NORTRONICS MODEL RA-100

NORTRONICS
MODEL RA-100



NORTRONICS
MODEL RA-100

TRADE NAME	Nortronics Model RA-100		
MANUFACTURER	Nortronics Co., Inc., 1015 S. Sixth Street, Minneapolis 4, Minn.		
TYPE SET	AC Operated 4 Tube Recording Amplifier		
POWER SUPPLY	110-120 Volts AC, 60 Cycles	RATING	17 Watts, .20 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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H905

DATE 3-59

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Preamp. - AF Amp.	12AX7	
V2	Cath. Follower - AF Amp.	12AX7	
V3	Bias Oscillator	12AU7A	
V4	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	NORTRONICS PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	450	101-35	PRS450V2020	BBRD2245	TCD75	TDLD-28	MTD-4520	TVA-2730
B	20	450							
C2A	20	450	101-35	PRS450V2020	BBRD2245	TCD75	TDLD-28	MTD-4520	TVA-2730
B	20	450							
C3	25	25	101-17	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205
C4	25	25	101-17	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

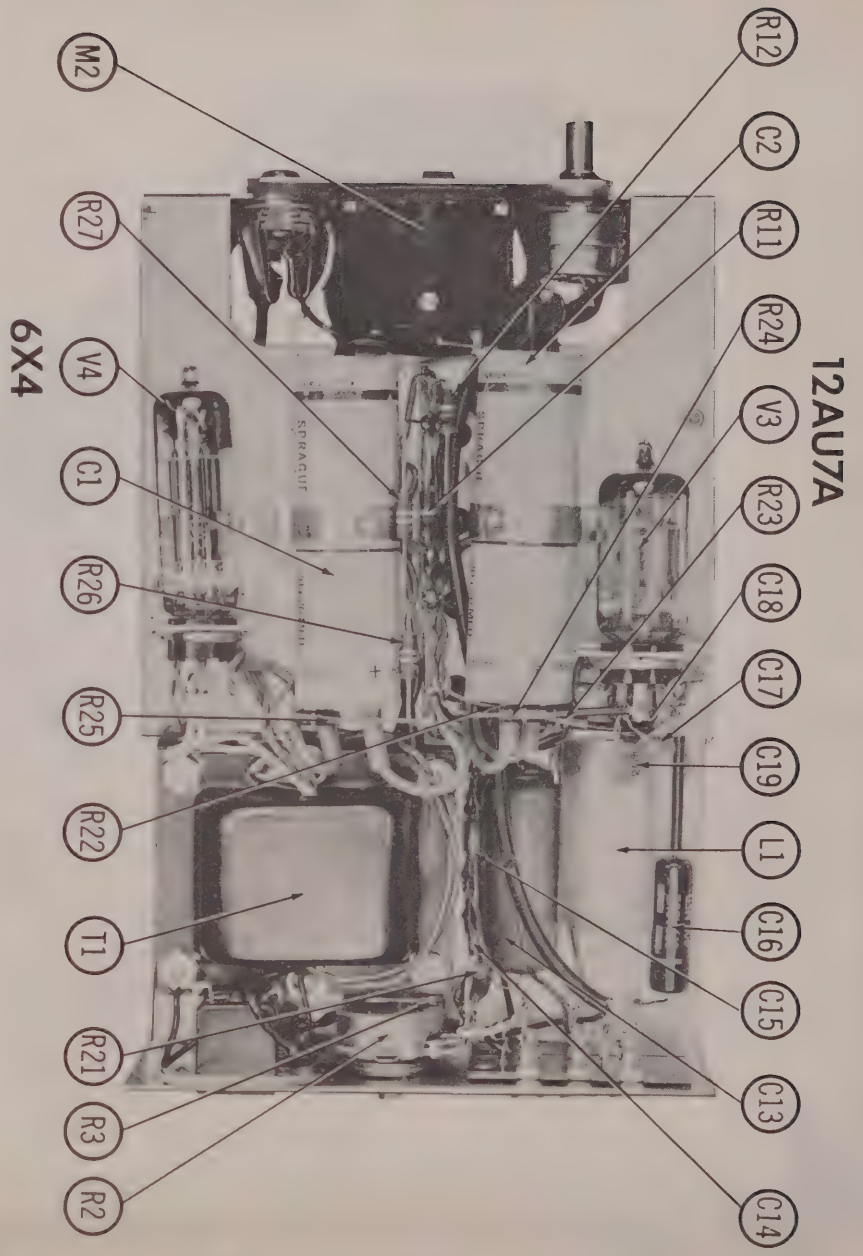
ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	NORTRONICS PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	.047	400	101-3	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C6	50		101-13	BPD-00005	DD-500	L10Q5	UC-545	5GA-Q5	
C7	.047	400	101-3	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C8	.047	400	101-3	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C9	.047	400	101-3	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C10	50		101-13	BPD-00005	DD-500	L10Q5	UC-545	5GA-Q5	
C11	220		101-31	SI 220	D6-221	LT6T22	UC-5322	5GA-T22	
C12	4700		101-34	BPD-0047	DD-472	BYA10D47	DC5247	5HK-D47	
C13	.47	200	101-8	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C14	470		101-32	BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C15	1000		101-33	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C16	.005	600	101-34	P688N-005	D6-502	CUB6D5	GEM-625	6TM-D5	
C17	470		101-32	BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C18	470		101-32	BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C19	1000		101-33	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	NORTRONICS PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	250K	½	110-18	B-51	A47-250K-Z	Q13-130	U44	Level
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	
R2A	100K	½	110-17	AB-40	A47-100K-S	Q11-128	U41	Bias
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	
R3A	250K	½	110-16	AB-50	A47-250K-S	Q11-130	U46	Current (Record Head)
B	Shaft			AK-1	FKS-1/4	Not Req.	Not Req.	

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	NORTRONICS PART No.	NOTES
R4	2200Ω		102-2221	
R5	10meg		102-1061	
R6	100K		102-1041	
R7	4700Ω		102-4721	
R8	27K		102-2731	
R9	100K		102-1041	
R10	2200Ω		102-2221	
R11	100Ω		102-1011	
R12	100Ω		102-1011	
R13	100K		102-1041	
R14	2200Ω		102-2221	
R15	2700Ω		102-2721	Note 1
R16	220K		102-2241	
R17	68K		102-6831	
R18	220K		102-2241	
R19	100K		102-1041	
R20	2200Ω		102-2221	
R21	10K		102-1031	
R22	22K		102-2231	Note 2
R23	22K		102-2231	Note 2
R24	2200Ω		102-2221	
R25	2200Ω		102-2221	
R26	27K		102-2731	
R27	27K		102-2731	

Note 1. Meter balance resistor varies from 1000Ω to 10K. Replace with original value.
Note 2. Some versions may use 27K in this application (Part #102-2731).

COILS

ITEM No.	USE	REPLACEMENT DATA NORTRONICS PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Bias Osc.	FG. 103-4					

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA NORTRONICS PART No.	Halldorson PART No.	Merit PART No.	Ram. PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .20A	520VCT @ .010A	6.3V @ 1.2A	103-6						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V @ .7A									

MISCELLANEOUS

ITEM No.	PART NAME	NORTRONICS PART No.	NOTES
M1	Switch	132-8	Mic-Head (DPDT, Slide Type)
M2	Meter	130-4	Volume Level

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

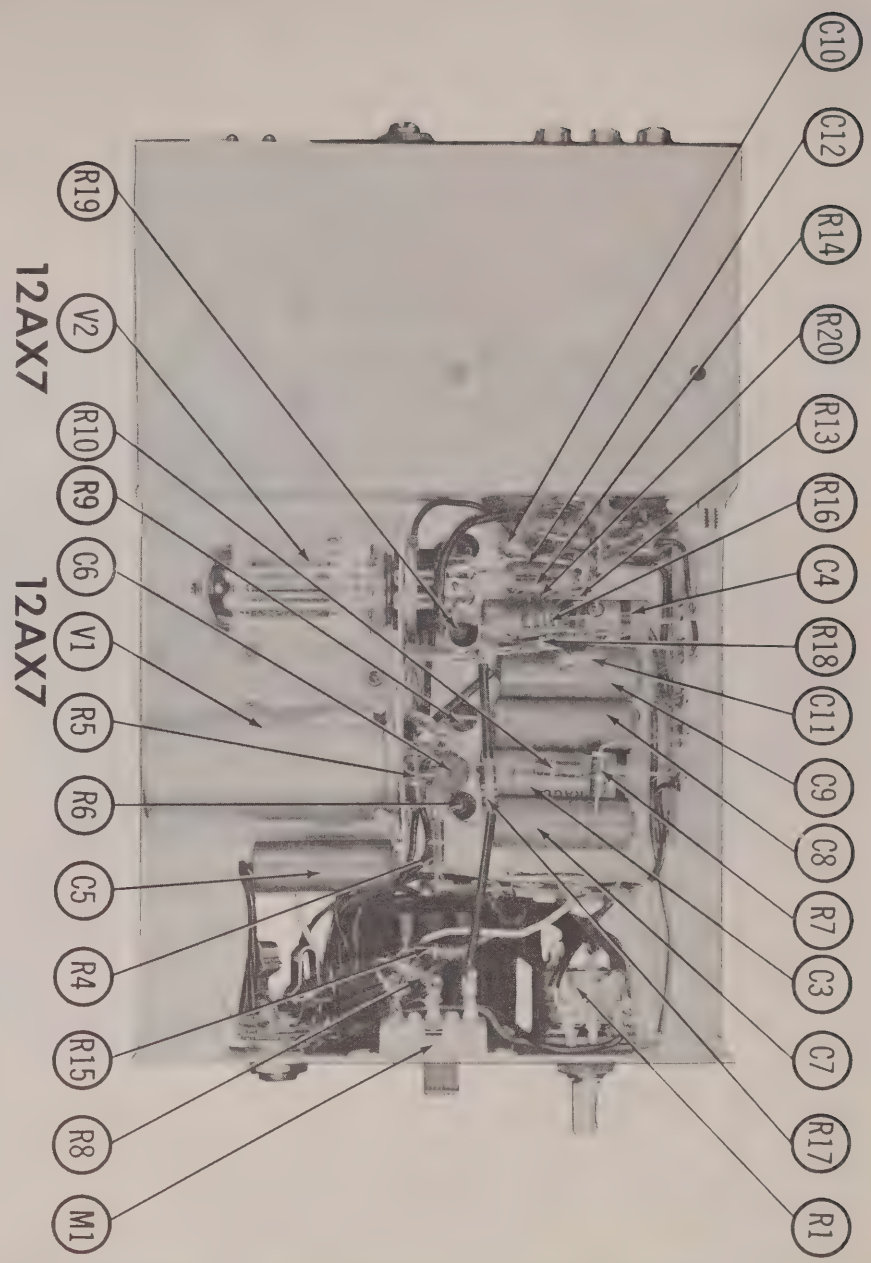
NAME	PART NO.	DESCRIPTION
Knob	131-7	Record Level-Off
Cover Screen	120-18	
Cover Screen	120-16	Includes Back Panel Assembly
Front Panel	163-9	
Back Panel	163-7	

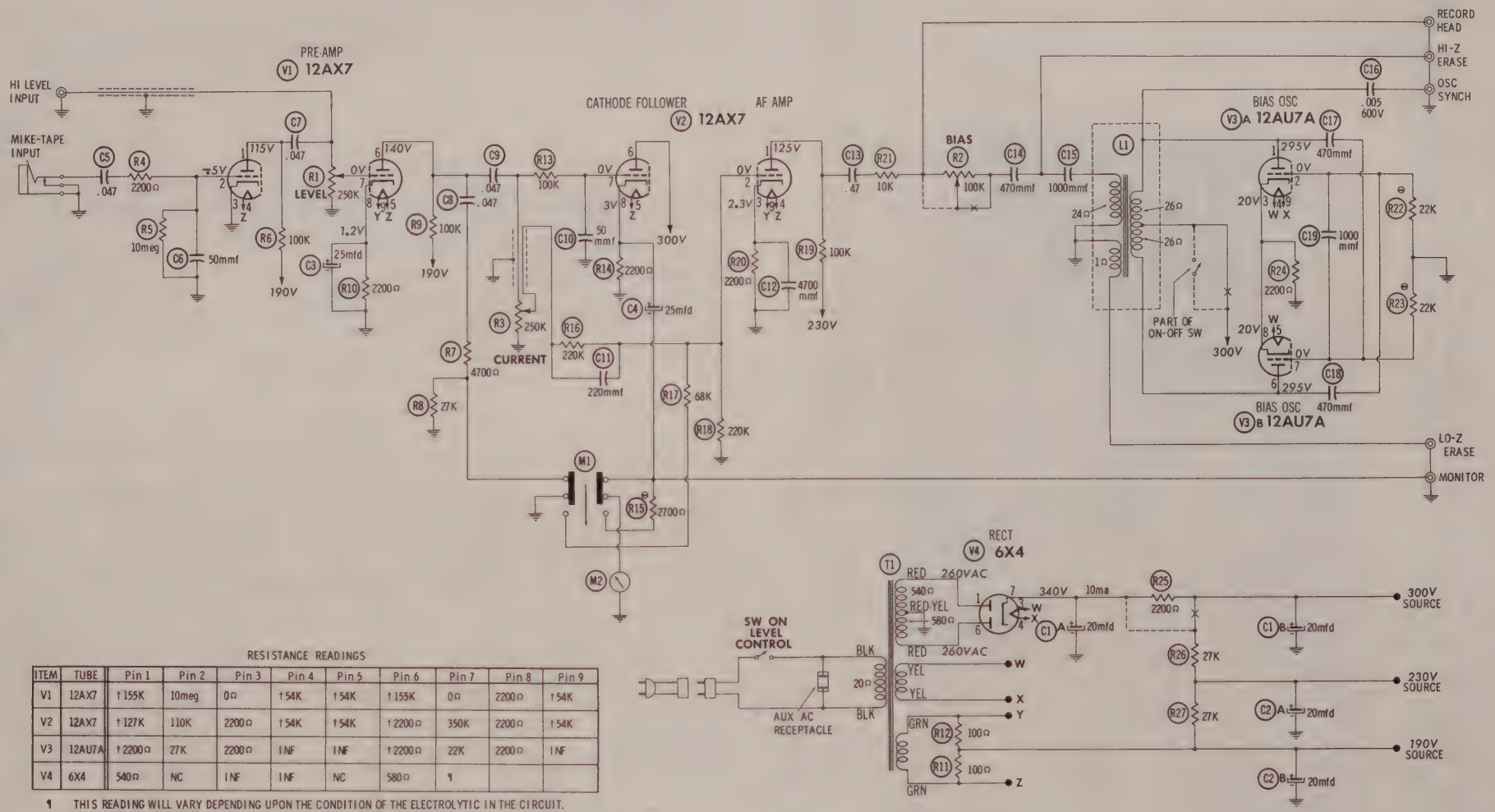
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†155K	10meg	0Ω	†54K	†54K	†155K	0Ω	2200Ω	†54K
V2	12AX7	†127K	110K	2200Ω	†54K	†54K	†2200Ω	350K	2200Ω	†54K
V3	12AU7A	†2200Ω	27K	2200Ω	INF	INF	†2200Ω	22K	2200Ω	INF
V4	6X4	540Ω	NC	INF	INF	NC	580Ω	¶		

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V4.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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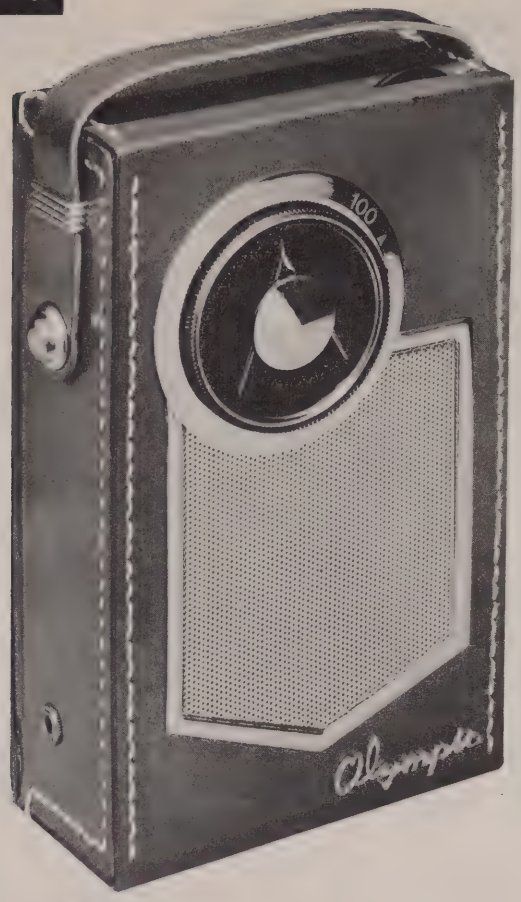
NORTRONICS MODEL RA-100

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

OLYMPIC MODEL 766

OLYMPIC MODEL 766



OLYMPIC MODEL 766

TRADE NAME	Olympic Model 766
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island City 1, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	6 Volts DC
TUNING RANGE—BROADCAST	540 - 1615KC
RATING	6.4MA@6 Volts DC(No Signal, Min. Volume) 9.5MA@6 Volts DC(Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1600KC	1600KC	"	A4	"
3.		"	600KC	600KC	"	A5	Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		"	1400KC	Tune for 1400KC signal	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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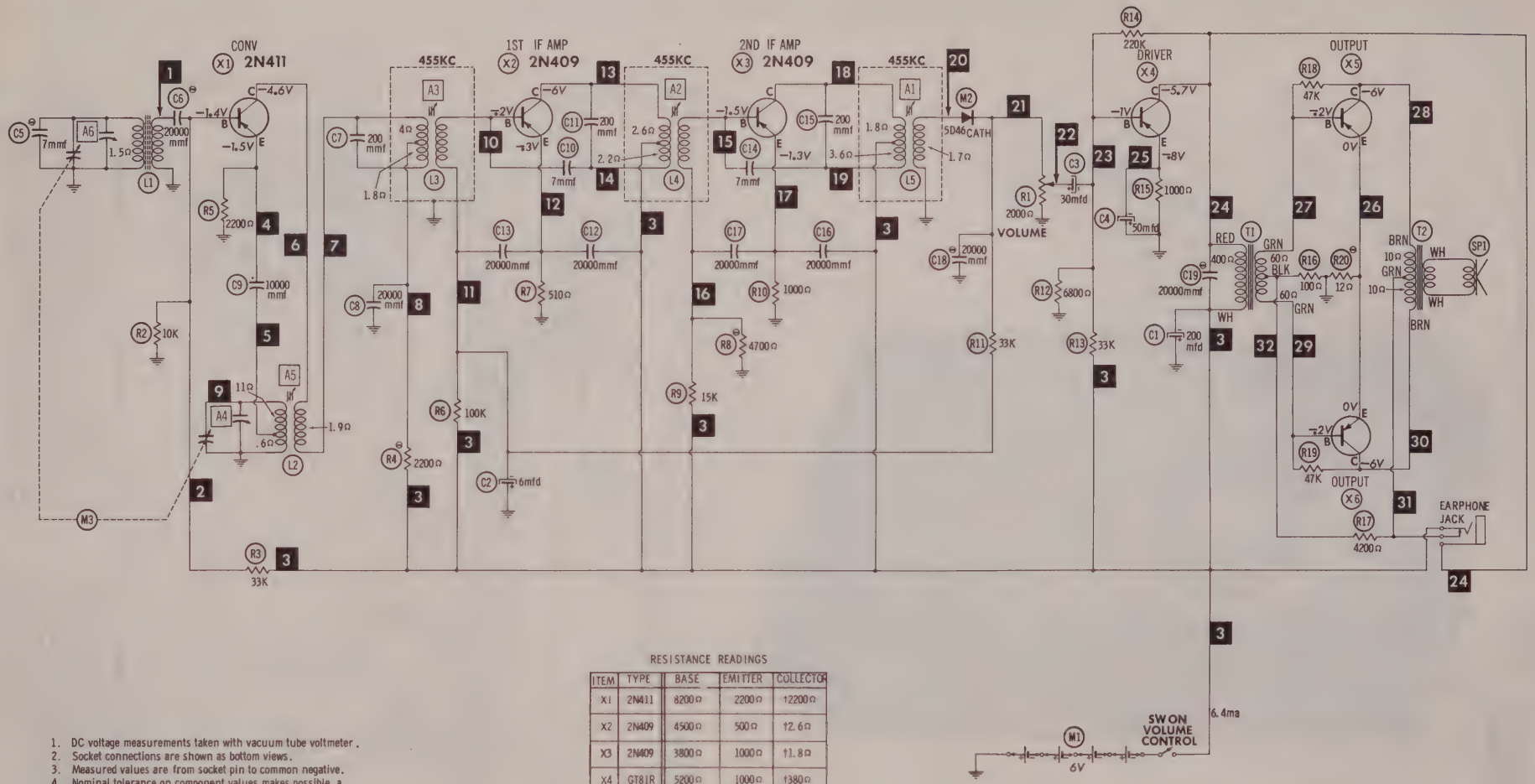

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	8200Ω	2200Ω	†2200Ω
X2	2N409	4500Ω	500Ω	†2.6Ω
X3	2N409	3800Ω	1000Ω	†1.8Ω
X4	GT81R	5200Ω	1000Ω	†380Ω
X5	GT109R	140Ω	12Ω	†10Ω
X6	GT109R	140Ω	12Ω	†10Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM JUNCTION OF R9 AND R13.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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OLYMPIC
MODEL 766

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411	Converter		2N411	2N486	2N411	PNP
X2	2N409	1st IF Amplifier		2N409	2N483	2N409	PNP
X3	2N409	2nd IF Amplifier		2N409	2N482	2N409	PNP
X4	GT81R	Driver		2N405	2N362	2N109	PNP
X5	GT109R	Output		2N407	2N632	2N109	PNP
X6	GT109R	Output		2N407	2N632	2N109	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	6		PWE6200	NL200-3				TE-1104
C2	6	6		XPP-6006	NL6-25	TT6X8	ML6-6		TE-1085
C3	30	6		PWE6030	NL30-6		ML30-6		TE-1092
C4	50	6		XPP-6050	NL50-6	TT6X50	ML50-6	MQ-650	TE-1100

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	7			NPO-SI 6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	①
C6	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	①
C7	200			SI 200	D6-201	LT6T2	UC-532	5GA-T2	
C8	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C9	10000			BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C10	7			NPO-SI 6.8	TCZ-6R8	CTA6V68C	ZT-5568	5TCCB-V68	
C11	200			SI 200	D6-201	LT6T2	UC-532	5GA-T2	
C12	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C13	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C14	7			NPO-SI 6.8	TCZ-6R8	CTA6V68C	UC-532	5TCCB-V68	
C15	200			SI 200	D6-201	LT6T2	UC-532	5GA-T2	
C16	20000			BPD-01	DD-203	BYB6S2	B-120	5HK-S2	
C17	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C18	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	②
C19	20000			BPD-02	DD-203	BYB6S2	B-120	5HK-S2	②

① Value may vary; Replace with original value.
② Some versions may use 10000mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2000Ω	1/4						Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R2	10K			
R3	33K			
R4	2200Ω			Note 1
R5	2200Ω			
R6	100K			
R7	510Ω			
R8	4700Ω			Note 2
R9	15K			
R10	1000Ω			
R11	33K			

Note 1. Value may vary; Replace with original value.

ITEM No.	RATING		OLYMPIC PART No.	NOTES
	OHMS	WATT		
R12	6800Ω			
R13	33K			
R14	220K			
R15	1000Ω			
R16	100Ω			
R17	4200Ω			
R18	47K			
R19	47K			
R20	12Ω			Note 1

Note 2. Some versions may use 5000Ω in this application.

PRINTED BOARD

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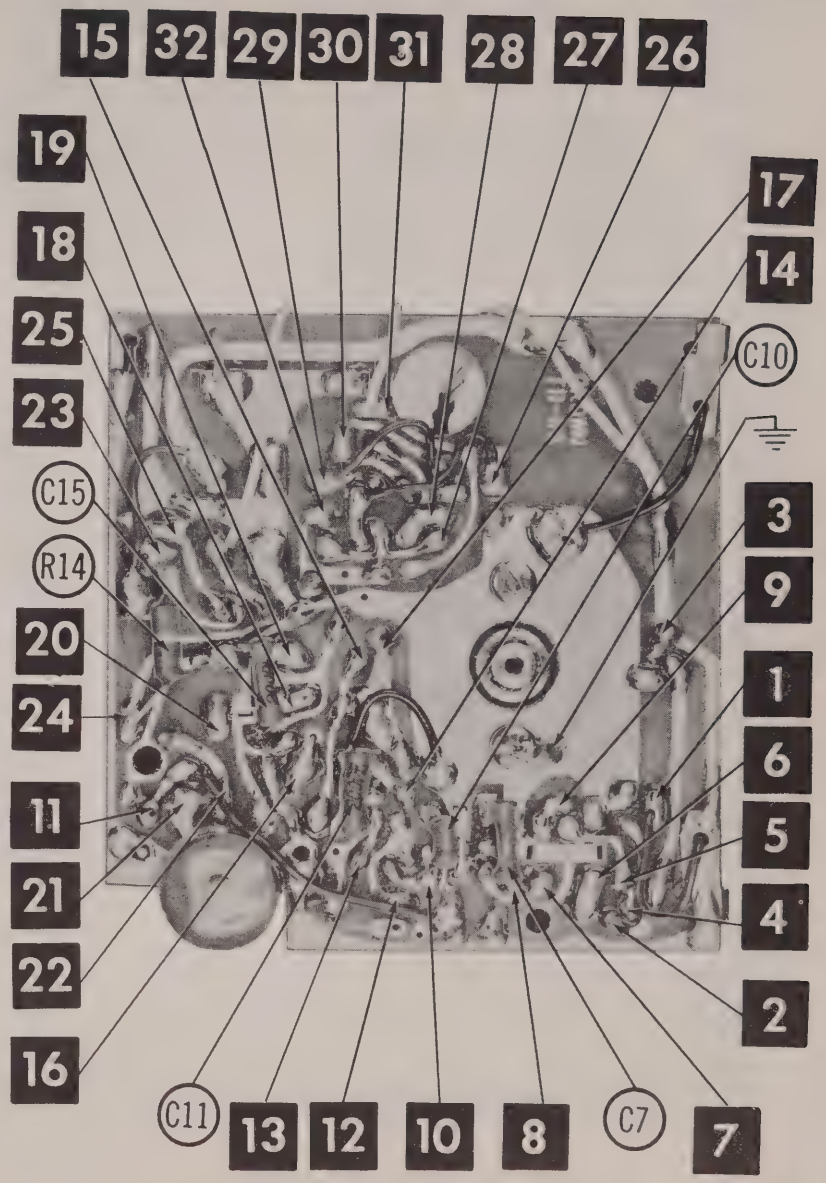


PARTS LIST & DESCRIPTION (continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		OLYMPIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick						
L2	Osc. Coil						
L3	1st IF Trans.						
L4	2nd IF Trans.						
L5	3rd IF Trans.						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	: 1		GH110 ①		TA-28 ①	TR-4 ①	T-41X ①	①Use original channel frame.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	650Ω CT	18Ω		GH105			TA-23	TR-20		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	2½"	PM	18Ω			

BATTERIES

ITEM No.	VOLTAGE	OLYMPIC PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			Z ①		1015 ① E91②		M-15R① ZM9①②	① 4 Used ② Mercury Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		OLYMPIC PART No.	CBS PART No.	SYLVANIA PART No.	
M2	5D46		1N60	1N295	Detector (Pigtail)

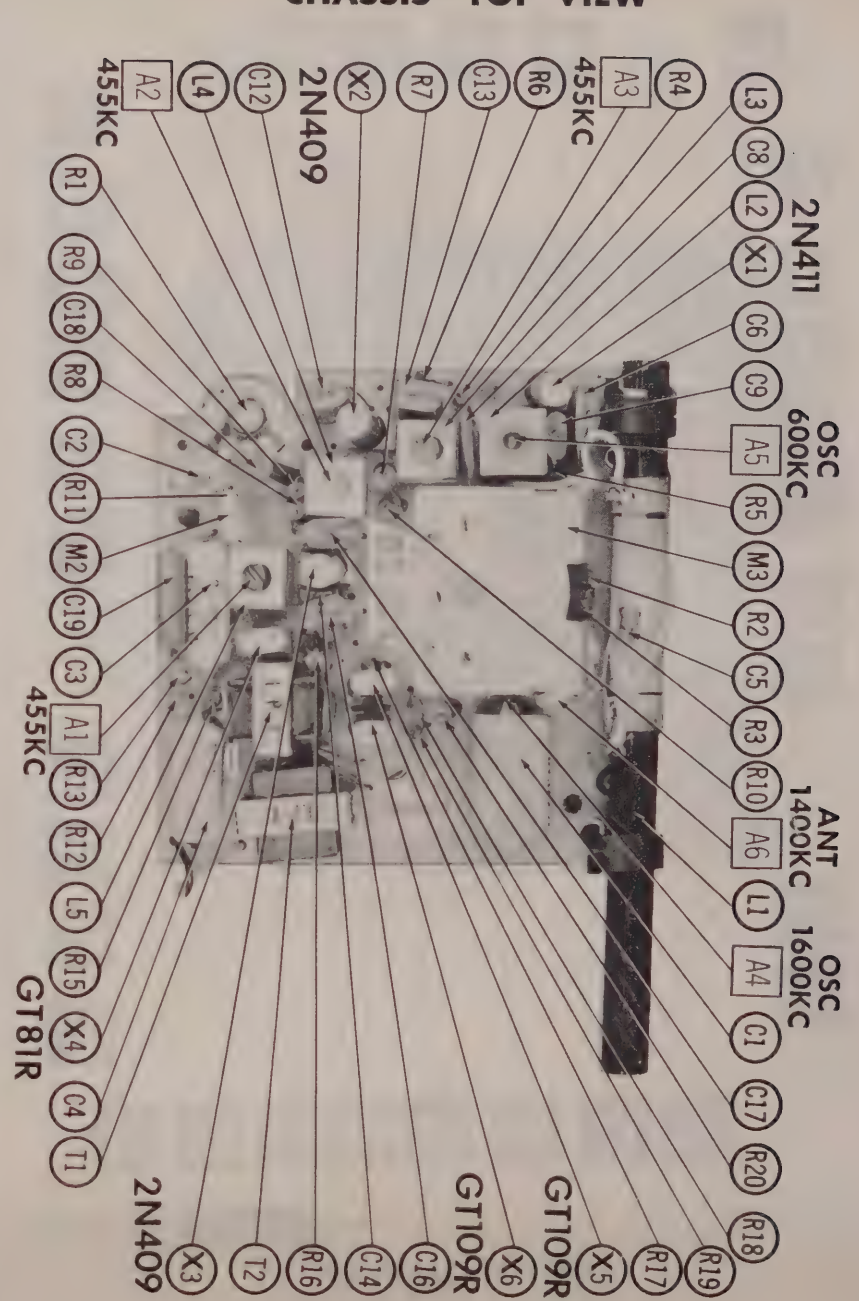
MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuning Cap.		2 Gang

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

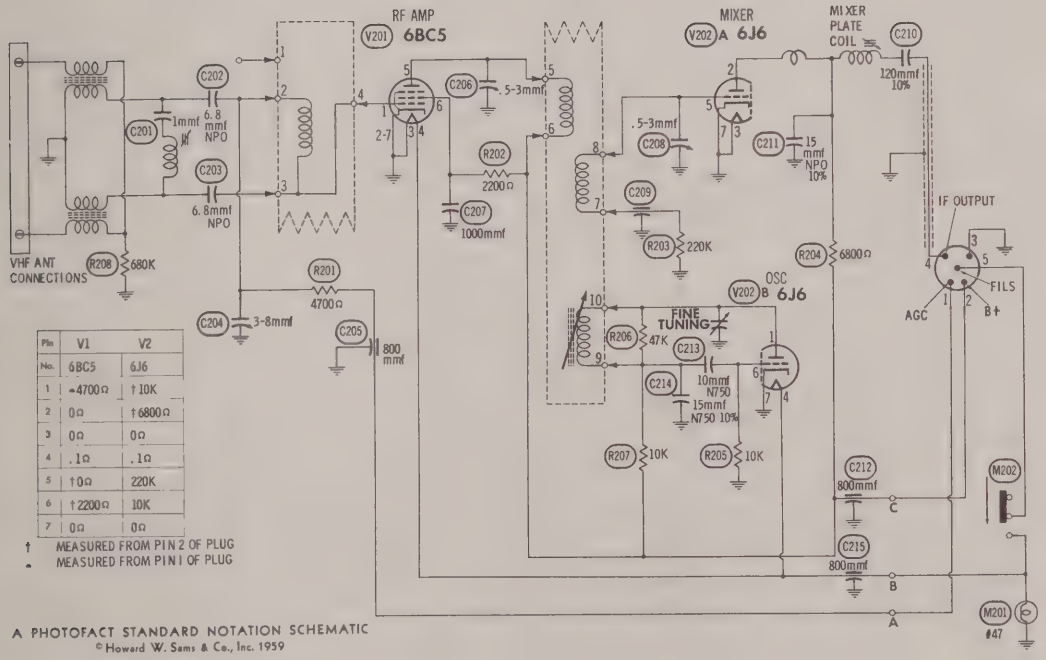
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

RAULAND
MODEL TV-55

RAULAND
MODEL TV-55

TRADE NAME	Rauland Model TV-55
MANUFACTURER	Rauland-Borg Corp., 3515 W. Addison Street, Chicago 18, Illinois
TYPE SET	Externally Powered TV Sound Tuner
TUBES	Two

RAULAND
MODEL TV-55



Pin No.	V1 6BC5	V2 6J6
1	-4700Ω	†10K
2	0Ω	†6800Ω
3	0Ω	0Ω
4	.1Ω	.1Ω
5	†0Ω	220K
6	†2200Ω	10K
7	0Ω	0Ω

† MEASURED FROM PIN 2 OF PLUG
- MEASURED FROM PIN 1 OF PLUG

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H914

DATE 3-59 SET 436 FOLDER 12

SET 436 FOLDER 12

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	6BC5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6J6	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RAULAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	1.			NPO-SI 1.0	TCZ-1			5TCCB-V1	
C202	6.8			NPO-DI 6.8	TCZ-6R8	CTA6V68C	CNO-568	5TCCB-V68	NPO
C203	6.8			NPO-DI 6.8	TCZ-6R8	CTA6V68C	CNO-568	5TCCB-V68	NPO
C204	3-8								
C205	800								
C206	.5-3								
C207	1000			BPD-001	DD-102	BYA6D1	B-210	5HK-D1	
C208	.5-3								
C209									
C210	120			NPO-DI 120	DD-121	CTA6T12C	CNO-312	5TCC-T12	10%
C211	15			NPO-DI 15	DTZ-15	CTA6Q15C	CNO-415	5TCC-Q15	NPO 10%
C212	800								
C213	10			N750-DI 10	DTN-10	CTA6Q1U	CN7-410	5TCU-Q1	N750
C214	15			N750-DI 15	DTN-15	CTA6Q15U	CN7-415	5TCU-Q15	N750 10%
C215	800								

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		RAULAND PART No.	NOTES
	OHMS	WATT		
R201	4700Ω			
R202	2200Ω			
R203	220K			
R204	6800Ω			

ITEM No.	RATING		RAULAND PART No.	NOTES
	OHMS	WATT		
R205	10K			
R206	47K			
R207	10K			
R208	680K			

MISCELLANEOUS

ITEM No.	PART NAME	RAULAND PART No.	NOTES
M201	Lamp	-	#47
M202	Switch	X-0277	Power On-Off (SPST, Slide Type)

WIRING DATA

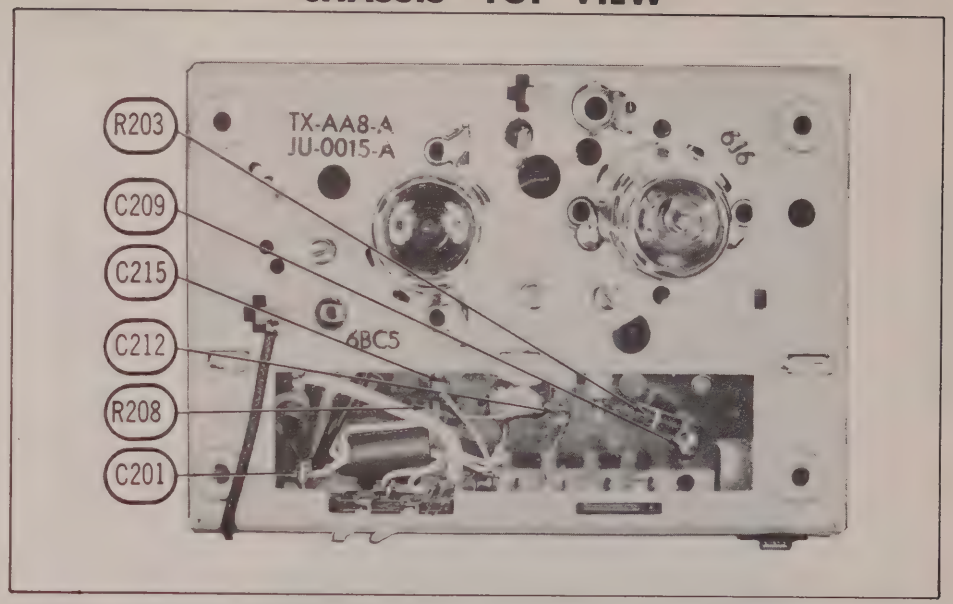
General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

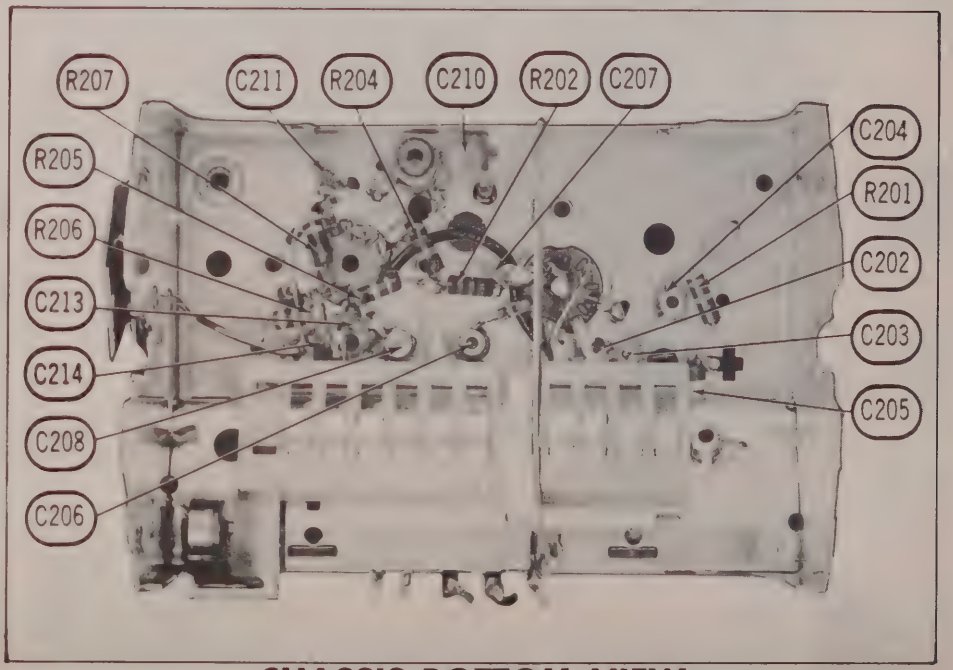
TUNER ALIGNMENT INSTRUCTIONS

TUNER OSCILLATOR ALIGNMENT

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best sound.

CHASSIS—TOP VIEW





CHASSIS-BOTTOM VIEW

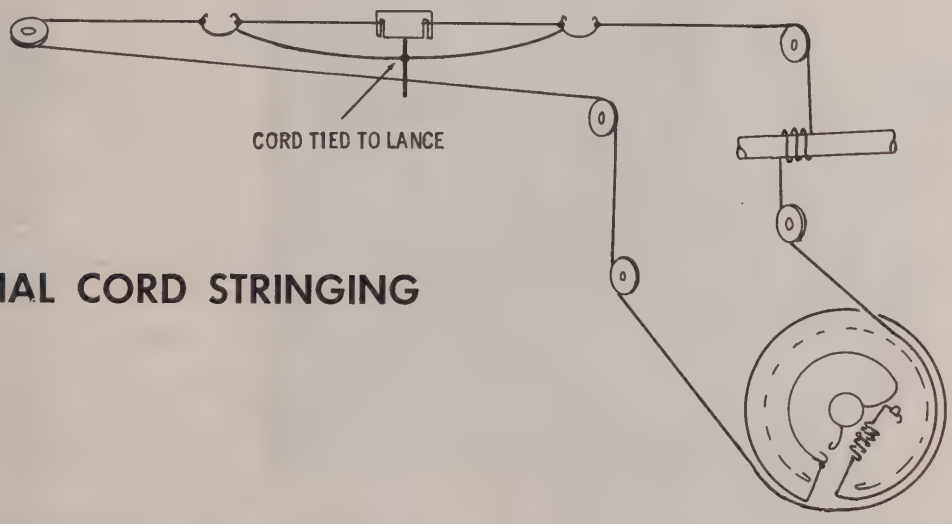
PHOTOFACT* Folder

RCA VICTOR MODEL
1MBT6 (Ch. RC-1184)

TRADE NAME	RCA Victor Model 1-MBT-6 (Ch. RC-1184)
MANUFACTURER	RCA Victor Radio & "Victrola" Div., Radio Corp. of America, Camden 8, N. J.
TYPE SET	Battery Operated Portable Transistorized 7-Band Receiver
POWER SUPPLY	13. 5 Volts DC
RATING	16MA @ 13. 5 Volts DC (No Signal, Min. Volume) 20MA @ 13. 5 Volts DC (Signal, Normal Volume)

TUNING RANGES

"A" Band (Broadcast)	540-1600KC	31 Meter Band	9. 45-9. 85MC
"B" Band	2. 0-4. 0MC	25 Meter Band	11. 55-12. 05MC
"C" Band	4. 0-8. 0MC	19 Meter Band	14. 90-15. 55MC
		16 Meter Band	17. 50-18. 20MC



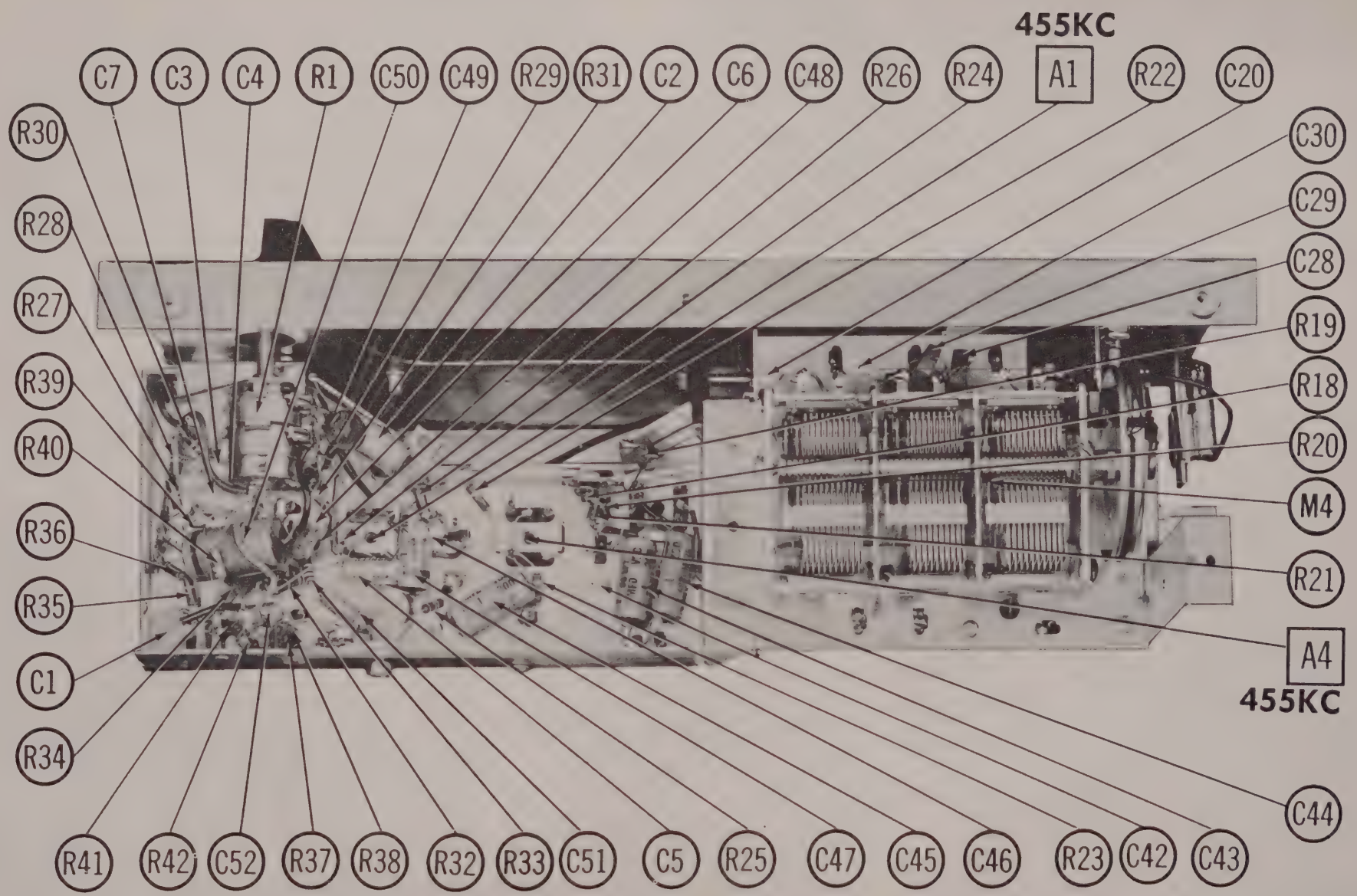
DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

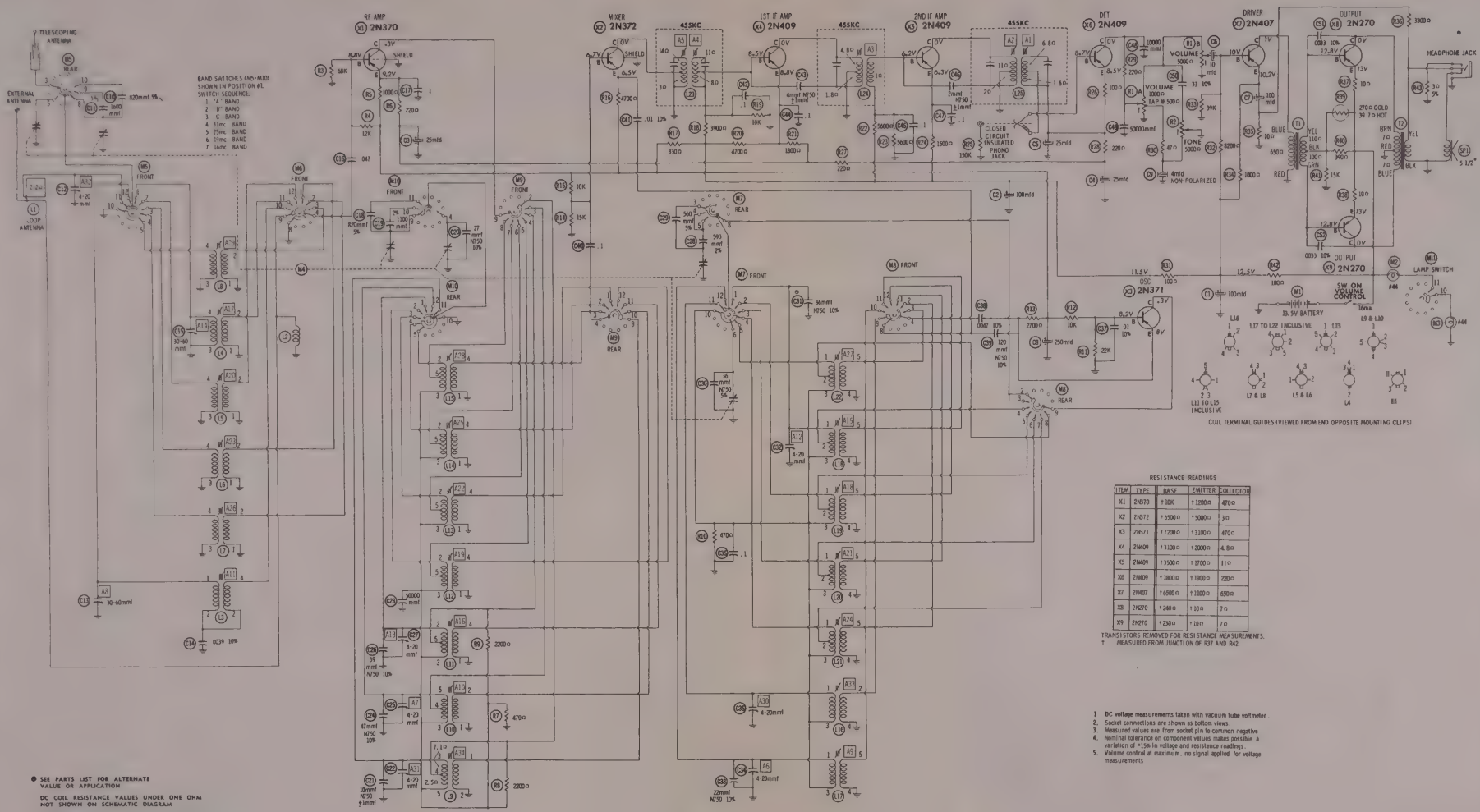
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H895

SET 436 FOLDER 13



CHASSIS BOTTOM VIEW



RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N370	†10K	†1200Ω	470Ω
X2	2N372	†6500Ω	†5000Ω	3Ω
X3	2N371	†7200Ω	†3100Ω	470Ω
X4	2N409	†3100Ω	†2000Ω	4.8Ω
X5	2N409	†3500Ω	†2700Ω	11Ω
X6	2N409	†1800Ω	†1900Ω	220Ω
X7	2N407	†6500Ω	†1200Ω	650Ω
X8	2N270	†240Ω	†10Ω	7Ω
X9	2N270	†230Ω	†10Ω	7Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM JUNCTION OF R37 AND R42.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

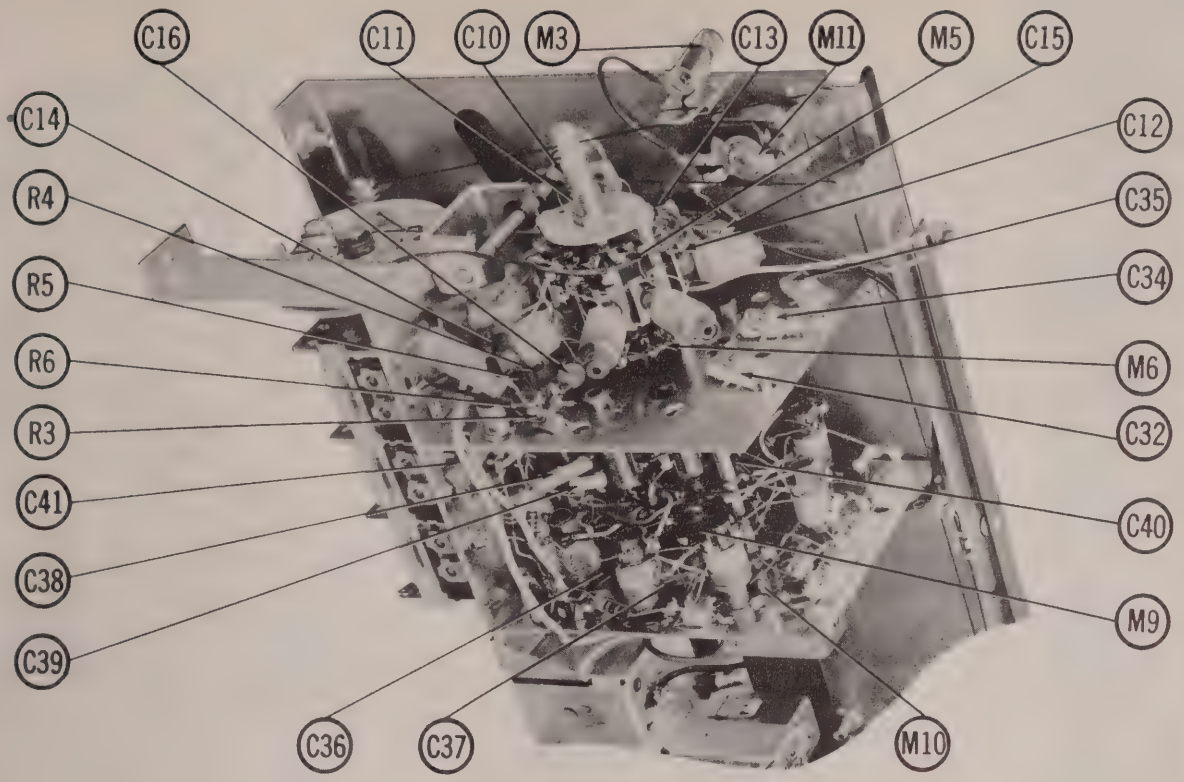
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

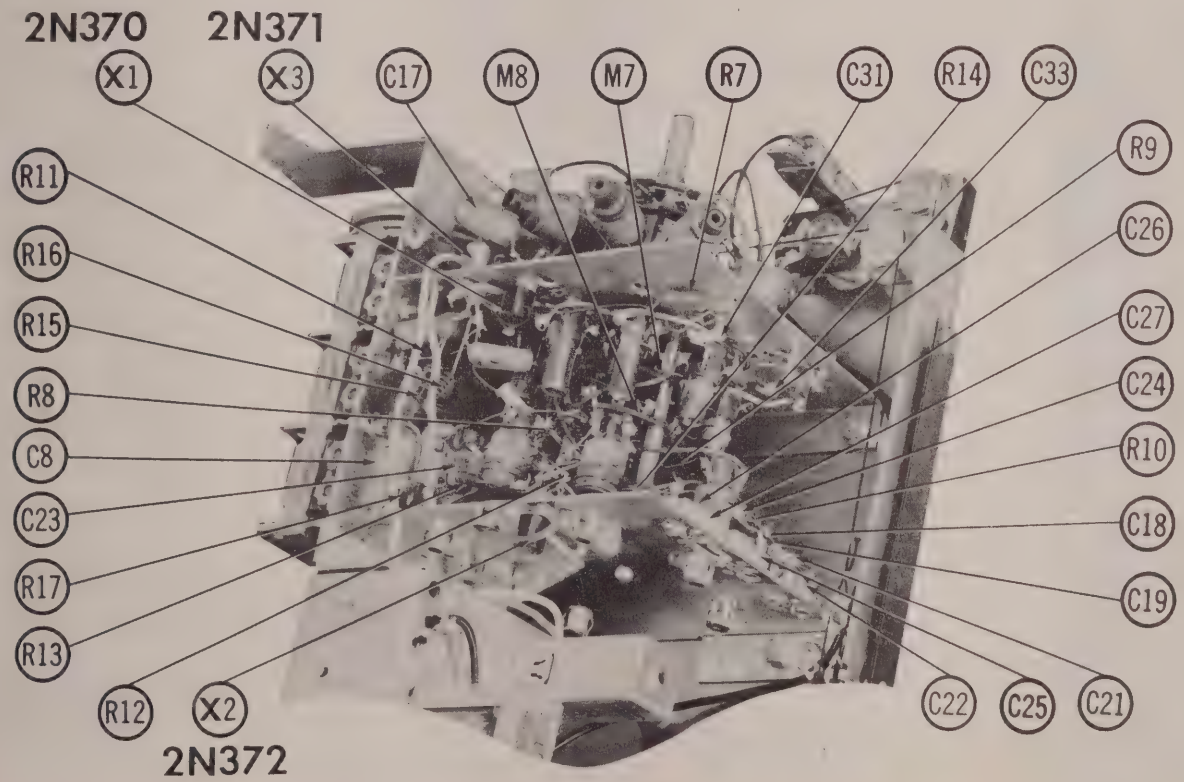
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1959

RCA VICTOR MODEL 1MBT6 (Ch. RC-1184)



BANDSWITCH ASSEMBLY - CAPACITOR, RESISTOR & MISC. IDENT.



BANDSWITCH ASSEMBLY - TRANSISTOR, CAPACITOR & RESISTOR IDENT

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

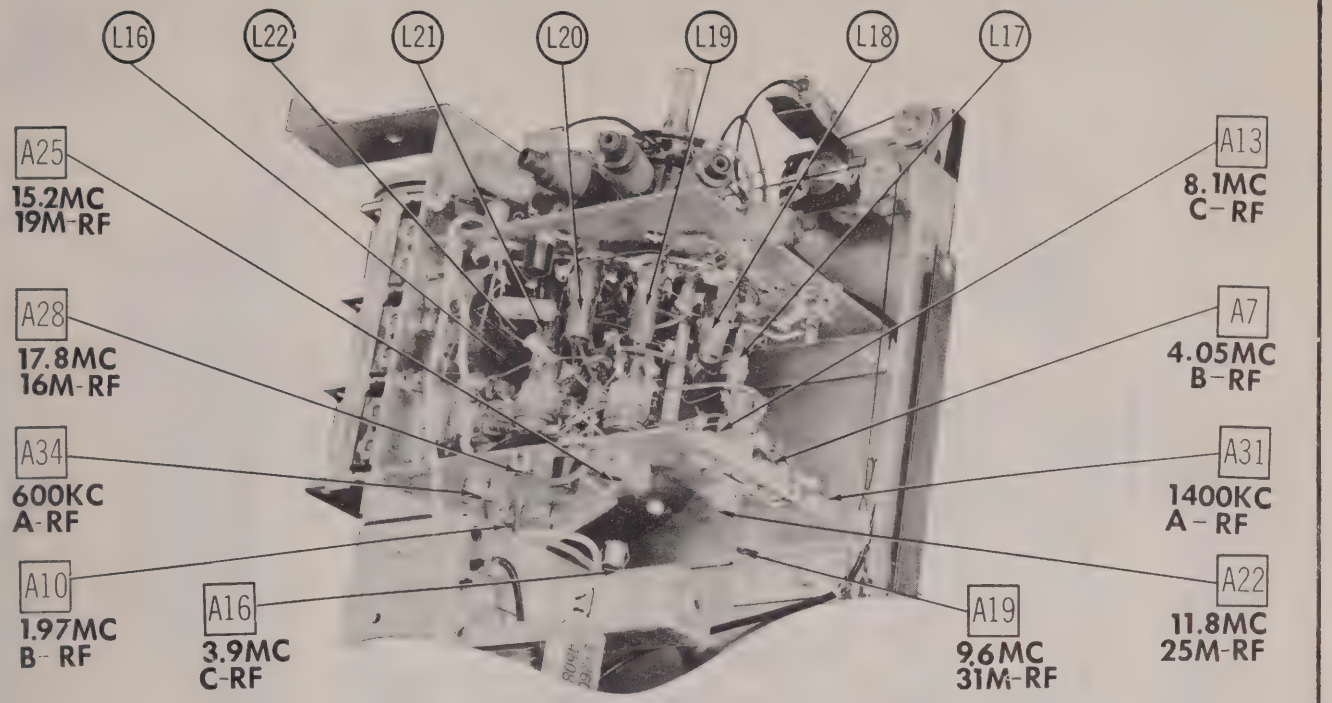
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4, A5.....GENERAL CEMENT #8195, 8275, 8728, 8729, 8987, 8988, 8989
WALSCO #2531, 2532

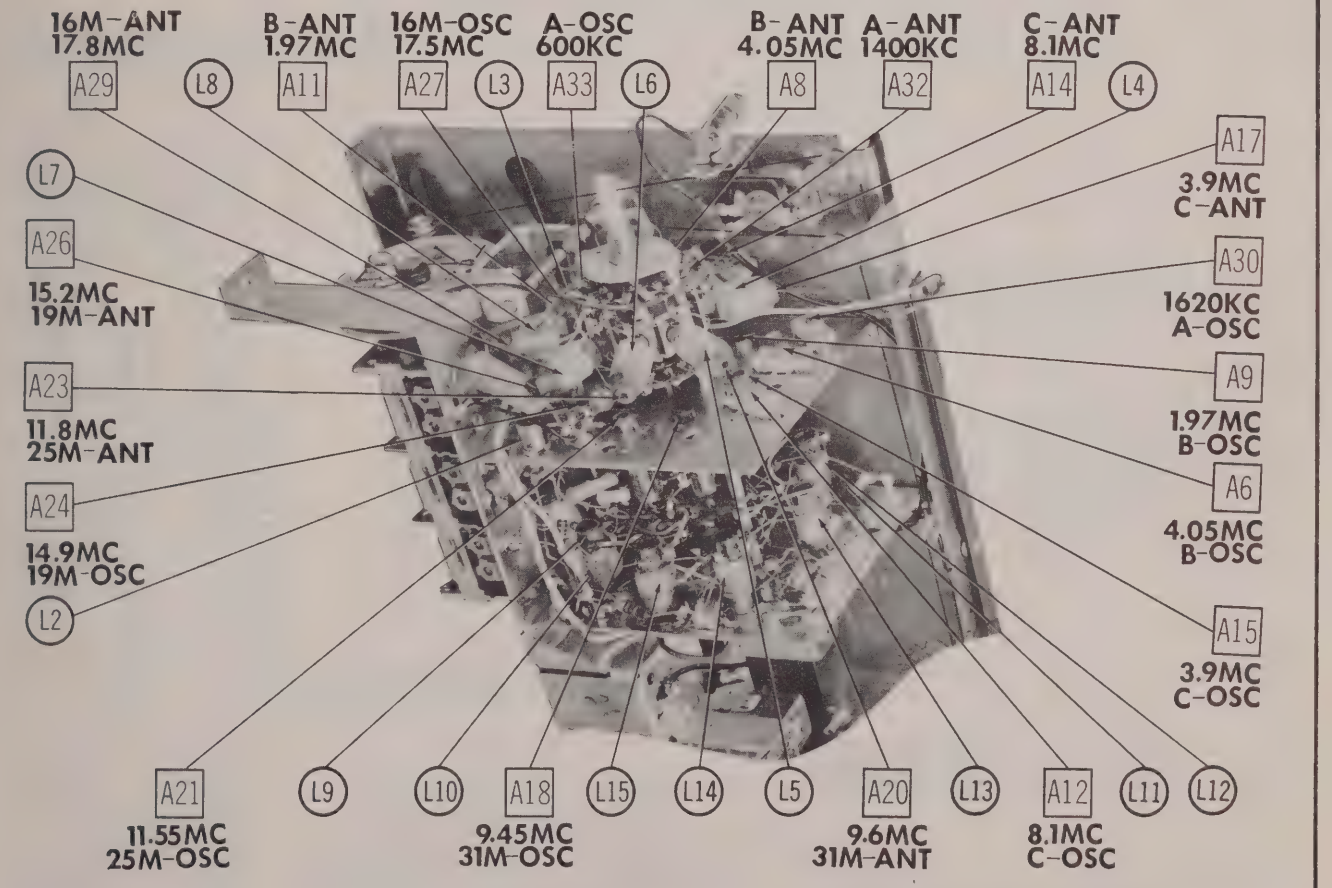
A6, A7, A9, A11, A12, A13, A17, A18, A19..GENERAL CEMENT #5000, 5003, 5004, 5008, 5009, 5066, 8195, 8277, 8290, 8607, 8821, 9105, 9106, 9291
WALSCO #2515, 2520, 2522, 2523, 2534, 2537, 2538

A8, A10, A14, A15, A16, A20, A21, A22, A23, A24, A25, A26, A27, A28, A29, A30, A31, A32, A33, A34..GENERAL CEMENT #8606, 8606L, 9295
WALSCO #2543, 2544, 2545

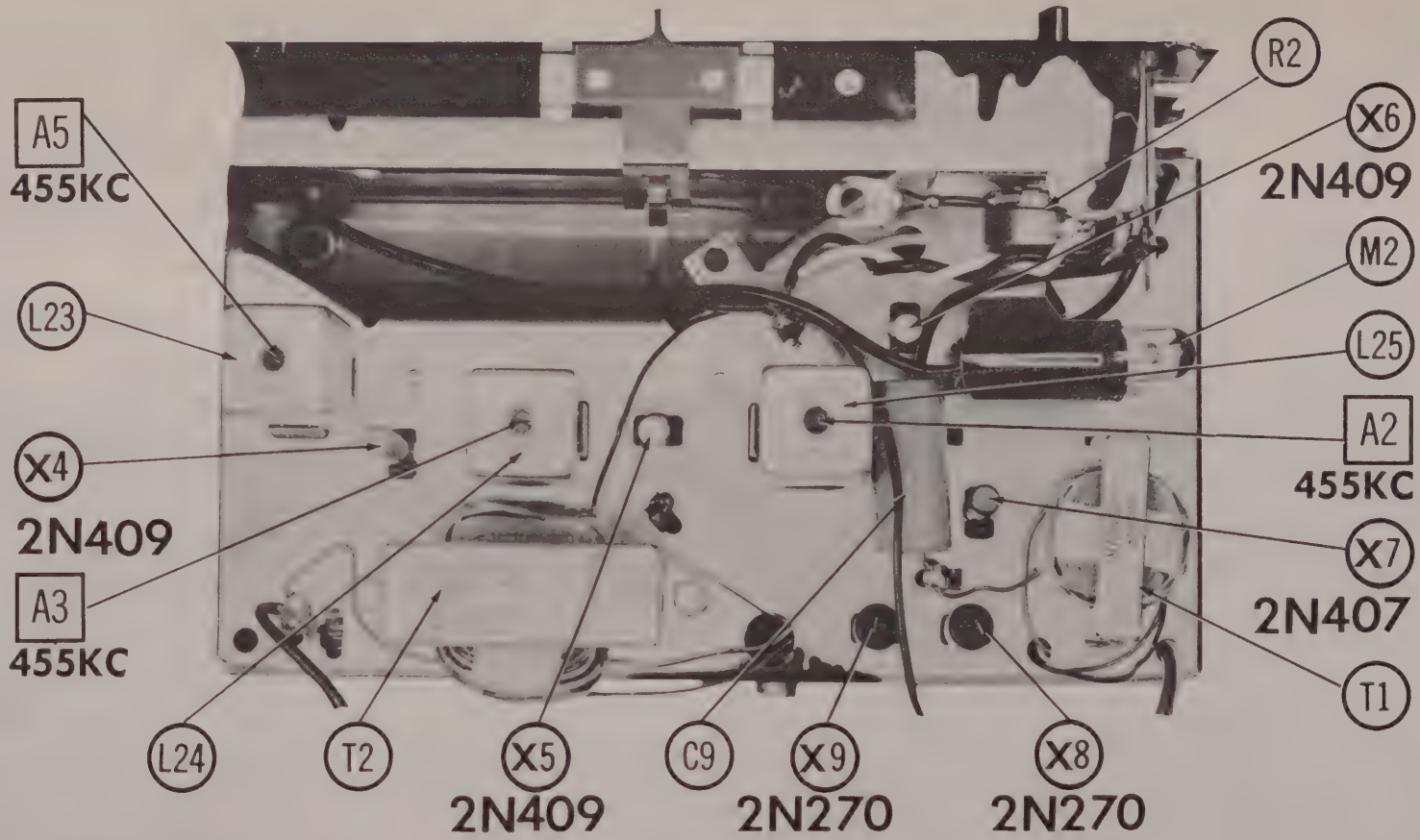
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to Base of Mixer (X2). Low side to chassis.	455KC (400∿ Mod.)	A	Point of non-interference near 1600KC	Across voice coil	A1, A2, A3, A4, A5	Adjust for maximum output. Repeat step 1.
2.	18mmf & 22Ω Carbon Resistor In Series	High side to lead normally connected to rod antenna. Low side to chassis.	4.05MC	B	Tuning gang fully open	"	A6, A7, A8	Adjust for maximum output.
3.	"	"	1.97MC	B	Tuning gang fully closed	"	A9, A10, A11	Adjust for maximum output. Repeat steps 2 and 3.
4.	"	"	8.1MC	C	Tuning gang fully open	"	A12, A13, A14	Adjust for maximum output.
5.	"	"	3.9MC	C	Tuning gang fully closed	"	A15, A16, A17	Adjust for maximum output. Repeat steps 4 and 5.
6.	"	"	9.45MC	31M	Tuning gang fully closed	"	A18	Adjust for maximum output.
7.	"	"	9.6MC	"	Tune to 9.6MC signal	"	A19, A20	Adjust for maximum output. Repeat steps 6 and 7.
8.	"	"	11.55MC	25M	Tuning gang fully closed	"	A21	Adjust for maximum output.
9.	"	"	11.8MC	"	Tune to 11.8MC signal	"	A22, A23	Adjust for maximum output. Repeat steps 8 and 9.
10.	"	"	14.9MC	19M	Tuning gang fully closed	"	A24	Adjust for maximum output.
11.	"	"	15.2MC	"	Tune to 15.2MC signal	"	A25, A26	Adjust for maximum output. Repeat steps 10 and 11.
12.	"	"	17.5MC	16M	Tuning gang fully closed	"	A27	Adjust for maximum output.
13.	"	"	17.8MC	"	Tune to 17.8MC signal	"	A28, A29	Adjust for maximum output. Repeat steps 12 and 13.
14.	Position chassis in back of cabinet so that tuner coils and trimmers will be accessible and reconnect loop.							
15.		Loop	1620KC	A	Tuning gang fully open	"	A30	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
16.		"	1400KC	A	Tune 1400KC signal	"	A31, A32	"
17.		"	600KC	A	Tune to 600KC signal	"	A33, A34	Adjust for maximum output while rocking tuning gang. Repeat steps 15, 16 and 17.



BANDSWITCH ASSEMBLY - ALIGN. & INDUCTOR IDENT.



BANDSWITCH ASSEMBLY - ALIGN. & INDUCTOR IDENT.



CHASSIS - IF & OUTPUT

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N370	RF Amplifier		2N370		2N370	PNP
X2	2N372	Mixer		2N372		2N372	PNP
X3	2N371	Oscillator		2N371		2N371	PNP
X4	2N409	1st IF Amplifier		2N409	2N483	2N409	PNP
X5	2N409	2nd IF Amplifier		2N409	2N482	2N409	PNP
X6	2N409	Detector		2N409	2N362	2N409	PNP
X7	2N407	Driver		2N407	2N363	2N407	PNP
X8	2N270	Output		2N270	2N361	2N270	PNP
X9	2N270	Output		2N270	2N361	2N270	PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	100	15	106055	SRE15V100	NL100-10	TT15X100	ML100-15		TE-1162
C2	100	15	106055	SRE15V100	NL100-10	TT16X100	ML100-15		TE-1162
C3	25	15	106054	PWE25025	NL25-10	TT15X30	ML30-15	MQ-0130	TE-1157.1
C4	25	15	106054	PWE25025	NL25-10	TT15X30	ML30-15	MQ-0130	TE-1157.1
C5	25	15	106054	PWE25025	NL25-10	TT15X30	ML30-15	MQ-0130	TE-1157.1
C6	10	10	106114	PWE10010	NL10-10	TT12X10	ML10-15		TE-1114
C7	100	15	106055	SRE15V100	NL100-10	TT15X100	ML100-15		TE-1162
C8	250	15	106552						TE-1138
C9	4	10AC	106353	NP-PRS50V4	BBR8-150 † BBR8-150 †	TC504	ML8-15 † ML8-15 †		R2316 *

* Not normally in distributors stock. Available thru distributor on order to manufacturer.
† Connect Negative Leads Together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C10	820		78143	1464-00082		1R5T82		MS-382	5%
C11	1600		106056	1464-0016		1R5D16		MS-216	5%
C12	4-20		78131						
C13	30-60		106009						
C14	.0039	200	106053						10%
C15	30-60		106009						
C16	.047	200	104133	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C17	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

CAPACITORS (cont)

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C18	820		78143	1464-00082		1R5T82		MS-382	5%
C19	1100		78144						2%
C20	27		72570		TCN-27	CTA6Q27U			N750 10%
C21	10		33098		TCN-10				N750 ±1mmf
C22	4-20		78131						
C23	50000		103380	BPD-05	DF-503			5HK-S5	
C24	47		39042	N750-SI 47	TCN-47	CTA6Q47U	NT-5447	5TCU-Q47	N750 10%
C25	4-20		78131						
C26	39		73664	N750-SI 39	TCN-39	CTA6Q39U			N750 10%
C27	4-20		78131						
C28	590		74929						2%
C29	560		39646	1464-00056		1R5T56		MS-356	5%
C30	36		106052		TCN-36				N750 5%
C31	36				TCN-36	CTA6Q36U			N750 10% ①
C32	4-20		78130						
C33	22		33101	N750-SI 22	TCN-22	CTA6Q22U		5TCU-Q22	N750 10%
C34	4-20		78130						
C35	4-20		78130						
C36	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C37	.01	200	101000				GEM-211		10%
C38	.0047	200	101721				GEM-16247		10%
C39	120		71614	N750-SI 120	TCN-120	CTA6T12U			N750 10%
C40	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C41	.01	200	101000				GEM-1611		10%
C42	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C43	4		100926						N750 ±1mmf
C44	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C45	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C46	2		100925						N750 ±1mmf
C47	.1	200	79251	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C48	10000		105716	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C49	50000		103380	BPD-05	DF-503			5HK-S5	
C50	.33	200	102215-A				GEM-2033		10%
C51	.0033	200	102425-A				GEM-16233		10%
C52	.0033	200	102425-A				GEM-16233		10%

① Some versions may use 39mmf in this application (Part #73664).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1000Ω	½	106199					Volume, Tap @ 500Ω
B	5000Ω	½						Volume
C	Switch							
R2	5000Ω	½	106198	B-12		Q17-114		Tone

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	RCA Victor PART No.	NOTES
R3	68K		502368	
R4	12K		502312	
R5	1000Ω		502210	
R6	220Ω		502122	
R7	470Ω		502147	
R8	2200Ω		502222	
R9	2200Ω		502222	
R10	470Ω		502147	
R11	22K		502322	
R12	10K		502310	
R13	2700Ω		502227	
R14	15K		502315	
R15	10K		502310	
R16	4700Ω		502247	
R17	330Ω		502133	
R18	3900Ω		502239	
R19	10K		502310	
R20	4700Ω		502247	
R21	1800Ω		502218	
R22	5600Ω		502256	
R23	5600Ω		502256	
R24	1500Ω		502215	
R25	150K		502415	
R26	100Ω		502110	
R27	220Ω		502122	
R28	220Ω		502122	
R29	220Ω		502122	
R30	47Ω		502047	
R31	100Ω		502110	
R32	8200Ω		502282	
R33	39K		502339	
R34	1000Ω		502210	
R35	10Ω		502010	
R36	3300Ω		502233	
R37	10Ω		502010	
R38	10Ω		502010	
R39	270Ω Cold 39.7Ω Hot		103021	
R40	390Ω		502139	
R41	15K		502315	
R42	100Ω		502110	
R43	3Ω 5%		72323	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA RCA Victor PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Antenna	106020 *					* Includes Lid
L2	BC Ant. Coil	106061					
L3	"B" Band Ant. Coil	106001					
L4	"C" Band Ant. Coil	106002					
L5	31M Band Ant. Coil	106003					
L6	25M Band Ant. Coil	106004					
L7	19M Band Ant. Coil	106005					
L8	16M Band Ant. Coil	106006					
L9	BC RF Coil	105994					
L10	"B" Band RF Coil	105995					
L11	"C" Band RF Coil	105996					
L12	31M Band RF Coil	105997					
L13	25M Band RF Coil	105998					
L14	19M Band RF Coil	105999					
L15	16M Band RF Coil	106000					
L16	BC Osc. Coil	105987					
L17	"B" Band Osc. Coil	105988					
L18	"C" Band Osc. Coil	105989					
L19	31M Band Osc. Coil	105990					
L20	25M Band Osc. Coil	105991					
L21	19M Band Osc. Coil	105992					
L22	16M Band Osc. Coil	105993					
L23	1st IF Coil	106017					
L24	2nd IF Coil	106018					
L25	3rd IF Coil	106019					

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO PRI.	TURNS RATIO SEC.	REPLACEMENT DATA RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2	: 1	106021				TR-66		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	500Ω CT	3-4Ω	106022							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA RCA Victor PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5½"	PM	3-4Ω	106398	52A21	

BATTERIES

ITEM No.	VOLTAGE	RCA Victor PART No.	REPLACEMENT DATA BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	NOTES
M1	13.5V	VS-036 ①		2R ①		A100 ①		M-13R ① RM-42A ②	① Nine used ② Nine used, Mercury Type

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M2	Lamp		#44
M3	Lamp		#44
M4	Tuning Cap.	106030	6 Gang, Ant. 11.5-453mmf, RF 11.5-453mmf, Osc. 10.5-410mmf
M5	Band Switch	106115	Section #1 (Rotary, Wafer Type)
M6	Band Switch	106116	Section #2 (Rotary, Wafer Type)
M7	Band Switch	106117	Section #3 (Rotary, Wafer Type)
M8	Band Switch	106118	Section #4 (Rotary, Wafer Type)
M9	Band Switch	106119	Section #5 (Rotary, Wafer Type)
M10	Band Switch	106120	Section #6 (Rotary, Wafer Type)
M11	Switch	106013	Lamp On-Off (SPST, Rotary, Spring Return, Wafer Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	106025	Tuning, Includes Spring
Knob	106462	Volume-On-Off, Includes Spring
Knob	106181	Tone, Includes Spring
Knob	106023	Band Selector, Includes Spring
Knob	106026	Light Switch Control, Includes Spring
Cabinet	X4335	Includes Back Cover Assembly, carrying Handle and Feet, Less Lid Assembly, Escutcheon, Dial, Grille, Antenna, Cap, Magnetic Latch, Motif, and Miscellaneous Hardware
Pointer Assembly	106008	
Handle	106040	Includes Link Assembly with Brass End Caps, and Top and Bottom Mounting Plates
Cabinet Lid Ass'y.	106020	Includes L1 (Complete)
Tuning Dial	106029	
Chart	106048	World Map and Time

WIRING DATA

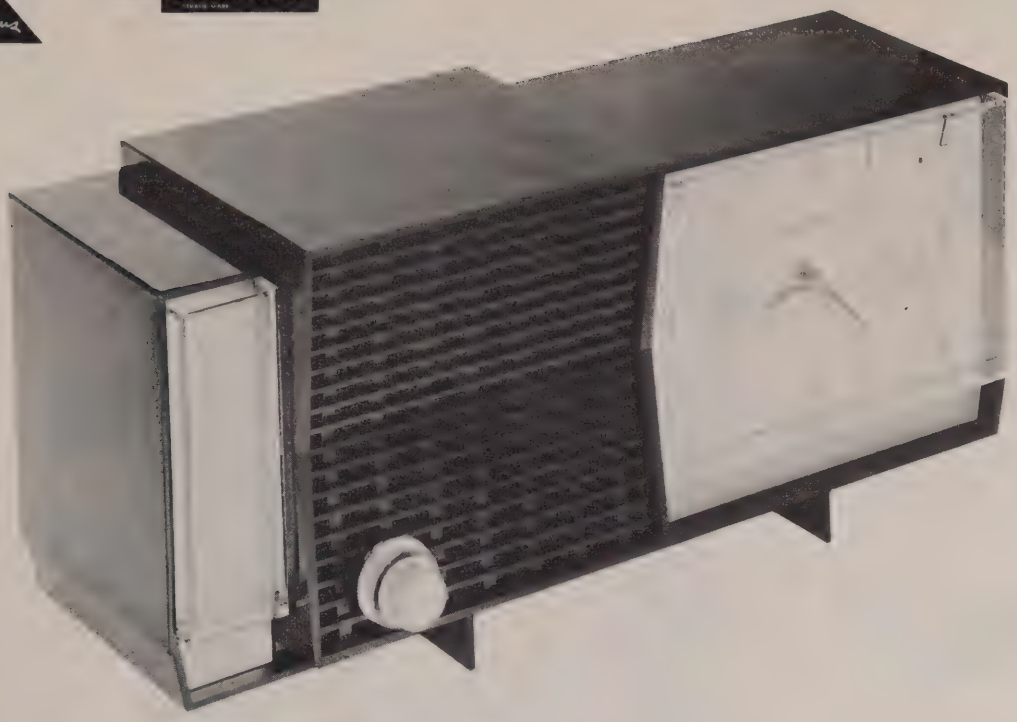
General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SILVERTONE MODELS 9024, 9025 (Ch. 528.53420)

SILVERTONE MODELS 9024, 9025 (Ch. 528.53420)



TRADE NAME	Silvertone Models 9024, 9025 (CH. 528.53420)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With Electric Clock
TUBES	Six
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	28 Watts, .29 Amp. @117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	535 - 1600KC

SILVERTONE MODELS 9024, 9025 (Ch. 528.53420)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Suggested alignment tools:
A1, A2, A3, A4.....General Cement #5009, 8195, 8274, 8275, 8728, 8987
Walsco#2531
A6, A9.....General Cement #8606, 8606L, 8282, 9295
Walsco #2526, 2543, 2544, 2545
A5, A7, A8.....General Cement #5000, 5003, 5014, 5015, 5016, 8276, 8290
Walsco #2512, 2515, 2522, 2523, 2525, 2537

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to Pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		Loop	1400KC	Tune for 1400KC Signal	"	A7, A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.			600KC	Tune for 600KC Signal	"	A9	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H896

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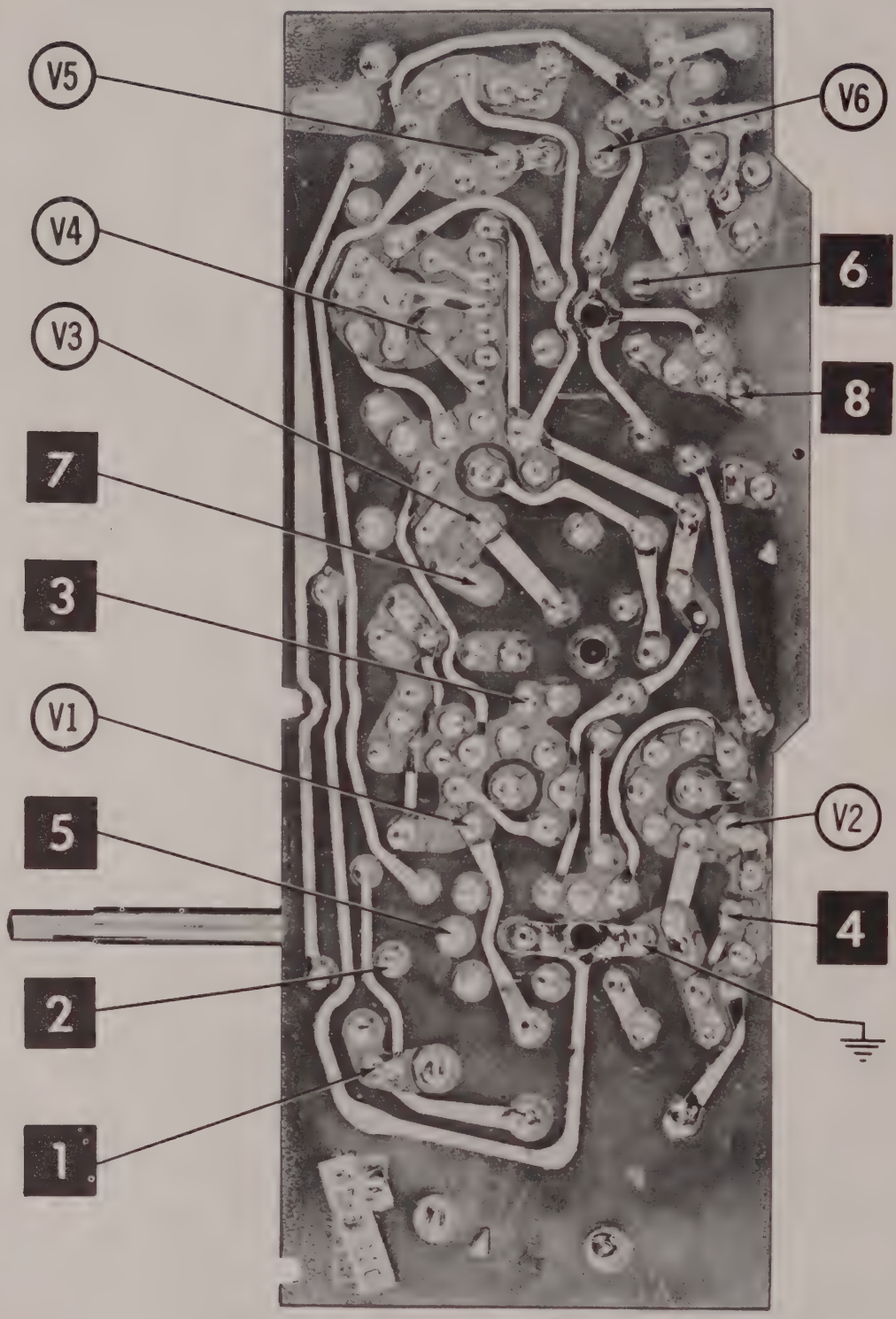
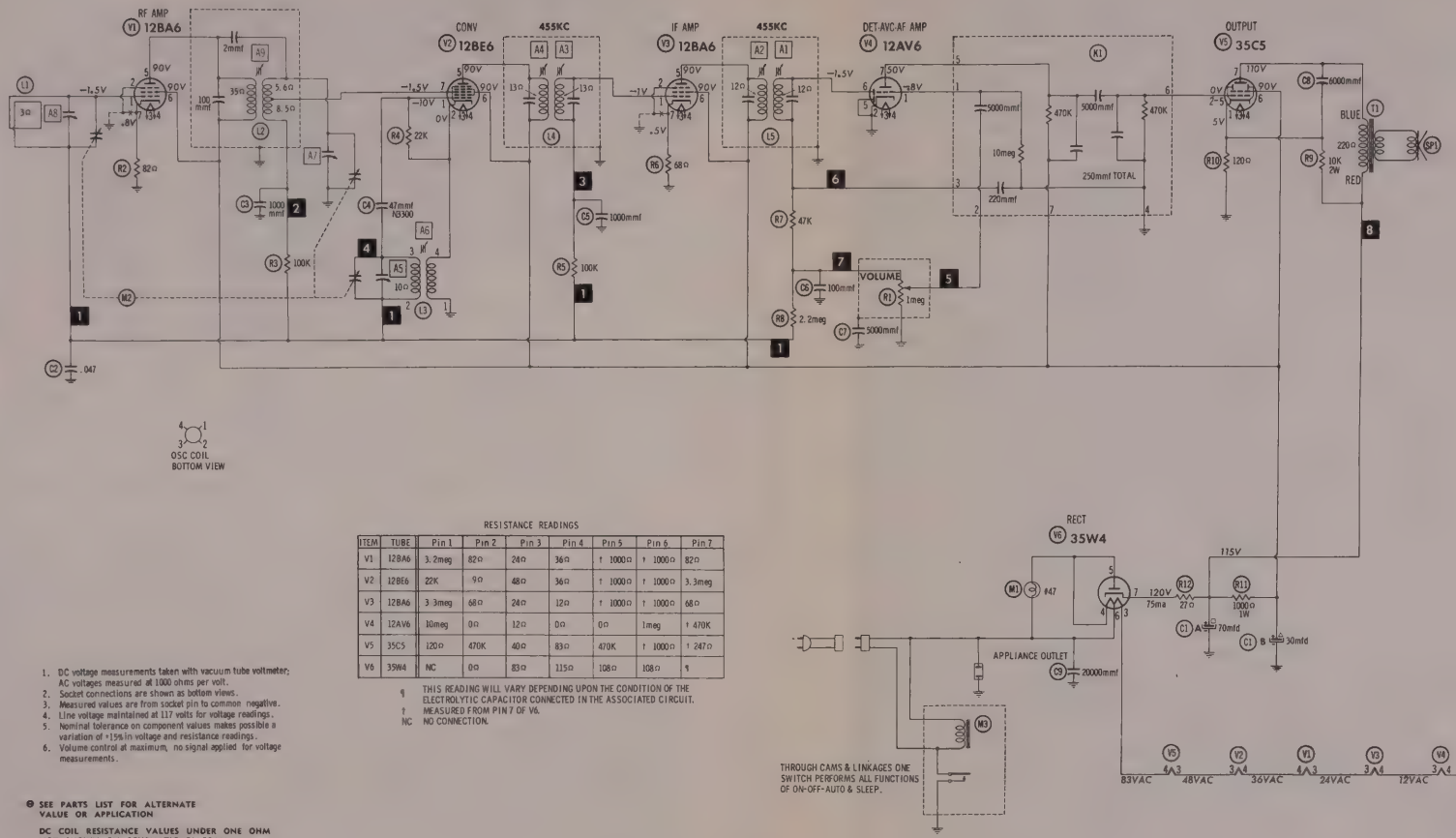
SET 436 FOLDER 14



A Howard W. Sams CIRCUITRACE Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



OSC COIL
BOTTOM VIEW

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	3.2meg	82Ω	24Ω	36Ω	† 1000Ω	† 1000Ω	82Ω
V2	12BE6	22K	9Ω	48Ω	36Ω	† 1000Ω	† 1000Ω	3.3meg
V3	12BA6	3.3meg	68Ω	24Ω	12Ω	† 1000Ω	† 1000Ω	68Ω
V4	12AV6	10meg	0Ω	12Ω	0Ω	0Ω	1meg	† 470K
V5	35C5	120Ω	470K	40Ω	83Ω	470K	† 1000Ω	† 247Ω
V6	35W4	NC	0Ω	83Ω	115Ω	108Ω	108Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
† MEASURED FROM PIN 7 OF V6.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE

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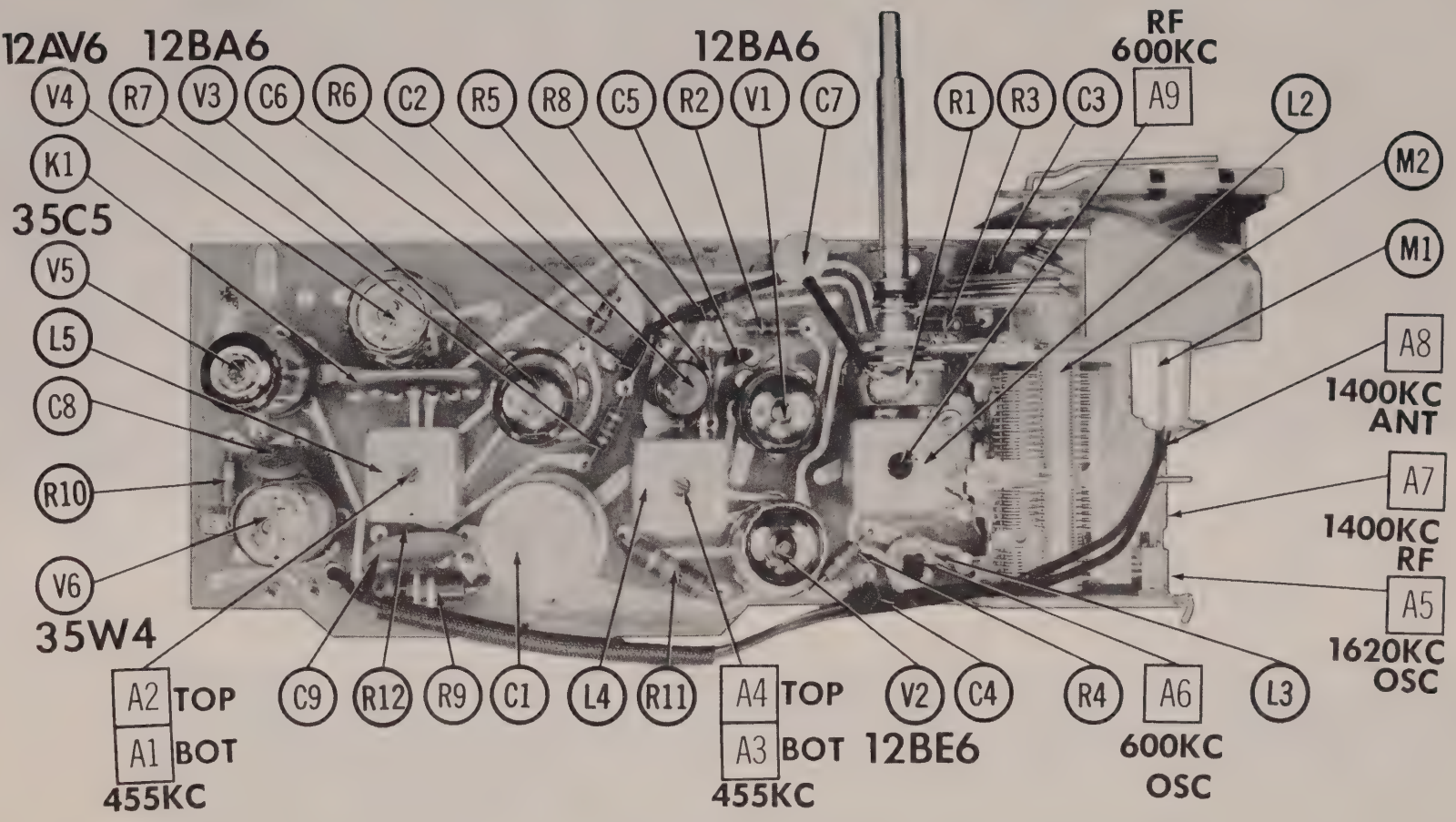
SILVERTONE MODELS 9024, 9025 (Ch. 528.53420)



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12AV6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 70	150	18-58-5	AFH2-17-50	BBRD8415	PFP214.3	TDLD-10	MTD-303	PCL-2441
B	▲ 30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	20-47-1	P288N-047	BC2S47J		ACE6147	2SE-S47	
C3	1000		15-10217	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C4	47		15-470118						N3300
C5	1000		15-10217	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C6	100		15-10116	BPD-0001	DD-101	L10T1	UC-531	5GA-T1	
C7	5000		15-50217	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C8	6000		15-60216						
C9	20000		15-20317	BPD-02	DD-203	BYB6S2		5HK-S2	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	24-276-0		A47-1meg-Z	Q13-137	U53	Volume
B	Shaft				RS-3/16	NQ	DS-37	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R2	82Ω		60-82001	
R3	100K		60-10401	
R4	22K		60-22302	
R5	100K		60-10401	
R6	68Ω		60-68001	
R7	47K		60-47301	
R8	2.2meg		60-22502	
R9	10K	2	60-10321	
R10	120Ω		60-12101	
R11	1000Ω	1	60-10211	
R12	27Ω		60-27001	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Ant.	82-8-1					Includes Cabinet Back
L2	RF Coil	10-23-0					
L3	Osc. Coil	10-35-4					
L4	Input IF	10-94-2	16-6780	BC-356	13-PC1	RF-4	
L5	Output IF	10-95-2	16-6780	BC-357	13-PC2	RF-4	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2300Ω	3-4Ω	80-14-1	Z1103	A-2928	AU-603	A-3876	22S46	S-1X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	33-295-4 ①	5A07	① Includes T1

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K1	Audio Coupling Circuit	5000mmf, 5000mmf, 220mmf, 250mmf, 470K, 470K, 10meg	13-14-3	Centralab Sprague	PC-158 DT-6

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M1	Lamp	89-7	#47
M2	Tuning Cap.	19-24-3	3 Gang, Ant. 36-495mmf
M3	Clock Timer	59-134	Includes Minute Hand, #52-70-1, Alarm Set Hand #52-86-1, Hour Hand, #52-71-1, Second Hand#52-69-1
	Dial Pointer	52-10-1	
	Dial Scale	67-632-0	
	Printed Board	D25-9-1K	

CABINETS & CABINET PARTS

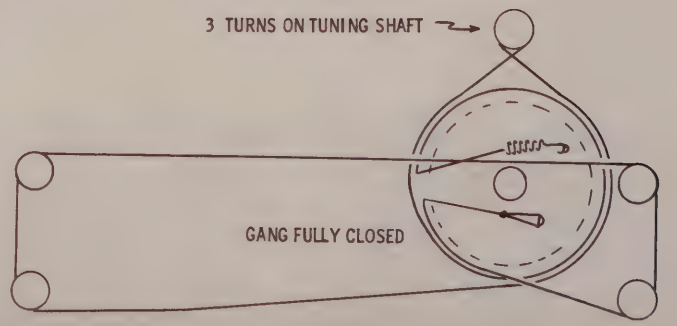
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-703-0	Tuning
Knob	52-702-0	Volume
Knob	52-1057-0	Clock Control, 2 Used
Cabinet	42-59-1	Model 9024
Cabinet	42-60-1	Model 9025
Window	48-143-1	Dial Scale
Window	48-158-1	Clock

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874



DIAL CORD STRINGING

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SILVERTONE MODELS 9045, 9046 (Ch. 528.53370)

SILVERTONE MODELS 9045, 9046 (Ch. 528.53370)

TRADE NAME	Silvertone Models 9045, 9046 (CH. 528.53370)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC Operated AM Receiver With 4 Speed Automatic Record Changer
TUBES	Six
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles
RATING	32 Watts, .35 Amp. @117 Volts AC (Less Motor)
TUNING RANGE—BROADCAST	535-1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SILVERTONE 528.56300 - PHOTOFACT SET 417 FOLDER 10.

SILVERTONE MODELS 9045, 9046 (Ch. 528.53370)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B-.
Suggested alignment tools:
A1, A2, A3, A4.....GENERAL CEMENT #5097, 8727
WALSCO #2515
A5, A7,.....GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6.....GENERAL CEMENT #8606, 8606L, 8262, 9295
WALSCO # 2526, 2543, 2544, 2545

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001mfd to reduce hum modulation.
2.	"	"	1630KC	1630KC	"	A5	"
3.	"	"	600KC	600KC	"	A6	Adjust for maximum output while rocking tuning gang. Repeat Steps 2 & 3.
4.		Loop	1400KC	Tune for 1400KC signal	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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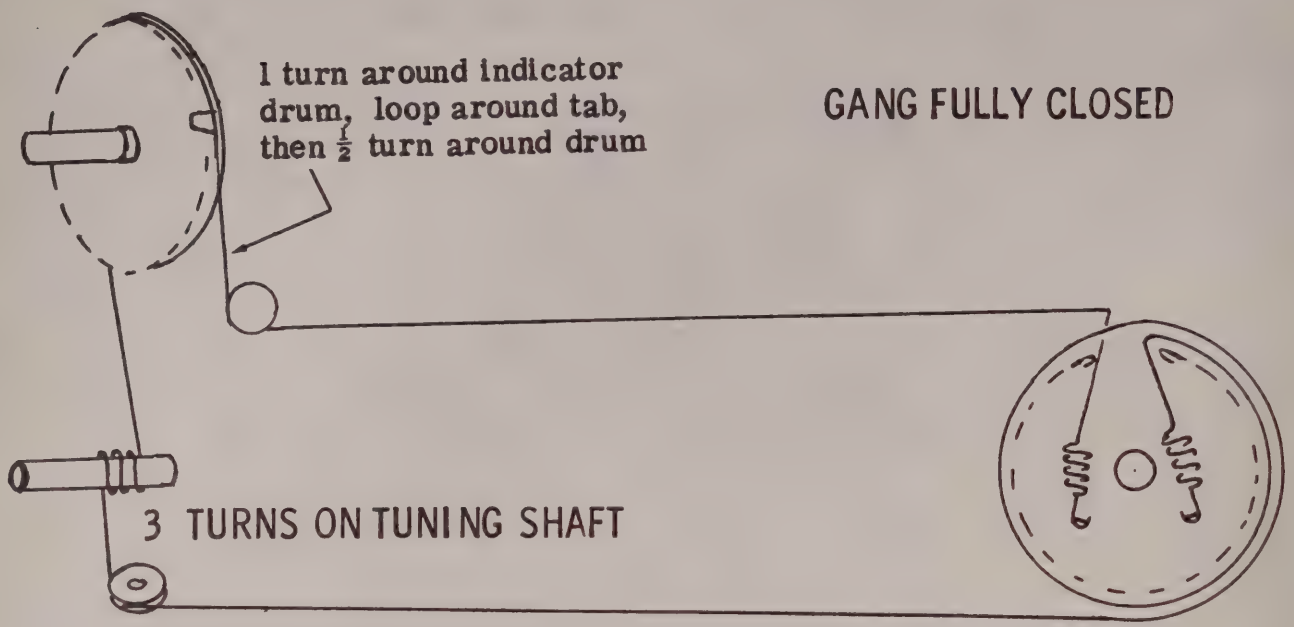
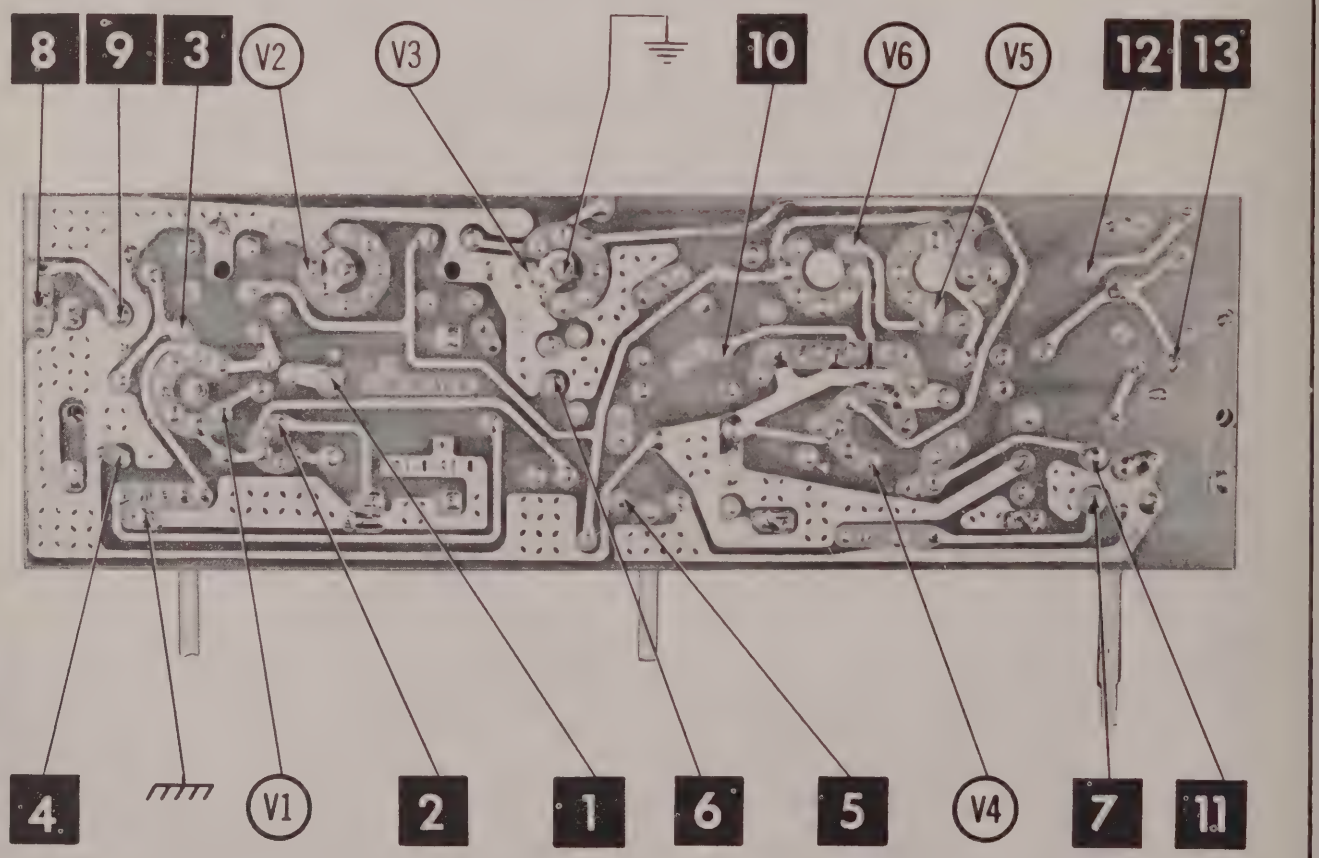


DIAL CORD STRINGING



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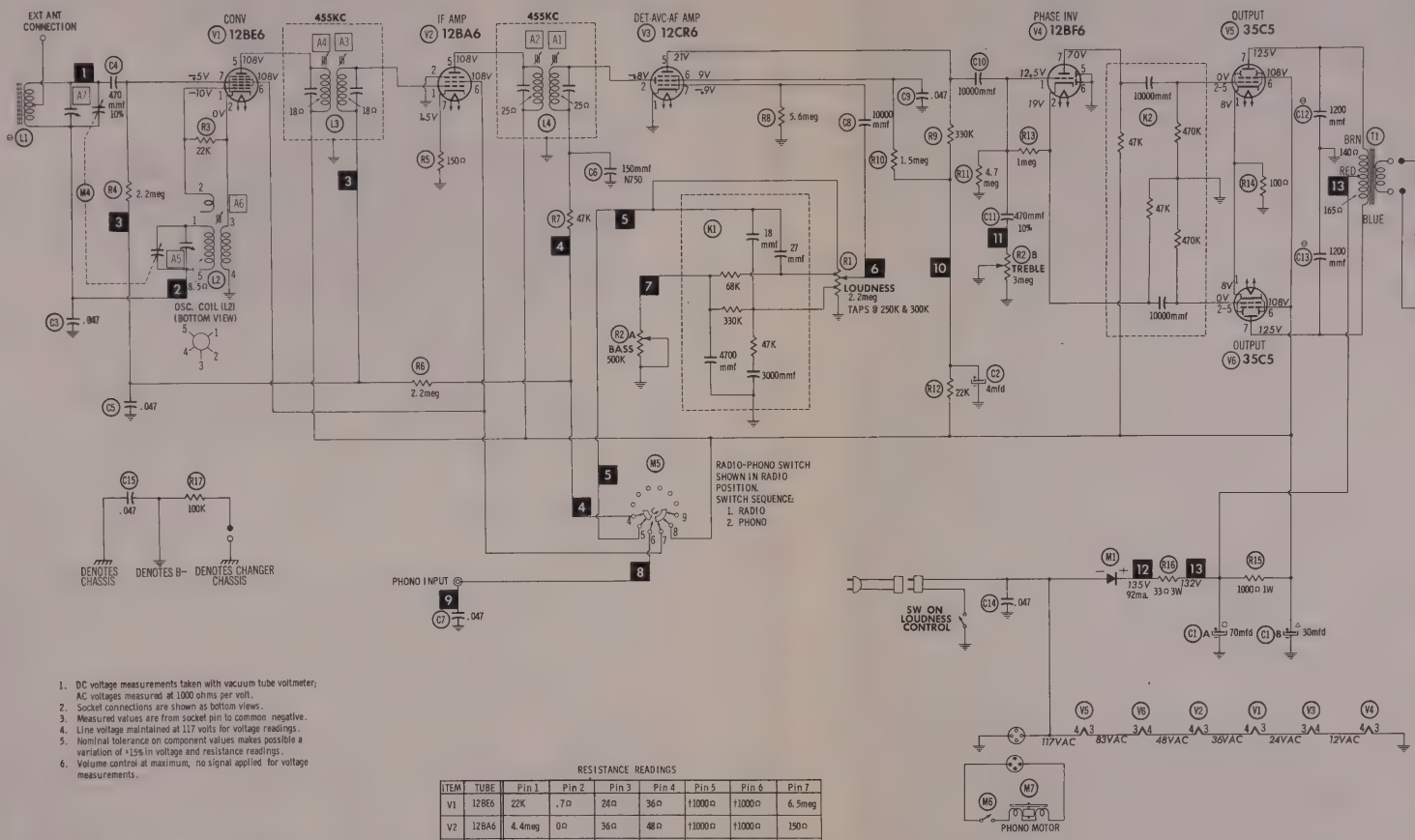
PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.7Ω	24Ω	36Ω	†1000Ω	†1000Ω	6.5meg
V2	12BA6	4.4meg	0Ω	36Ω	48Ω	†1000Ω	†1000Ω	150Ω
V3	12CR6	0Ω	2.2meg	24Ω	12Ω	†350K	†1.5meg	5.6meg
V4	12BF6	800K	47K	0Ω	12Ω	0Ω	0Ω	†47K
V5	35C5	100Ω	470K	83Ω	110Ω	470K	†1000Ω	†175Ω
V6	35C5	100Ω	470K	83Ω	48Ω	470K	†1000Ω	†188Ω

† MEASURED FROM OUTPUT OF M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SILVERTONE MODELS 9045, 9046 (Ch. 528.53370)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12CR6	
V4	Phase Inverter	12BF6	
V5	Output	35C5	
V6	Output	35C5	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■70	150	18-58-5	AFH2-17-50		PFP214.3	TDLD-11		PCL-2441
B	▲30	150							
C2	4	150	18-62-5	PRS150V4	BBR4-150	TT150X4	TD-4-150	MT-1504	TVA-1402

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.047	400	20-44-1	P488N-047	DF-503	BC6S47J	ACE6147	4SE-S47	
C4	470		15-47111		D6-471	5R5T47		MS-347	10%
C5	.047	200	20-47-1	P288N-047	DF-503	BC2S47J	ACE6147	2SE-S47	
C6	150		15-151164	N750-DI 150	DTN-150	C10T15U		5TCU-T15	N750
C7	.047	400	20-44-1	P488N-047	DF-503	BC6S47J	ACE6147	4SE-S47	
C8	10000		15-10316	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	.047	200	20-47-1	P288N-047	DF-503	BC2S47J	ACE6147	2SE-S47	
C10	10000		15-10316	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C11	470		15-47111		D6-471	5R5T47		MS-347	10%
C12	1200			DI-0012	DD-122	BYA10D12	UC-5212	5GA-D12	Note 1
C13	1200			DI-0012	DD-122	BYA10D12	UC-5212	5GA-D12	Note 1
C14	.047	400	20-55-1	P488N-047		BC6S47J	ACE6147	4SE-S47	
C15	.047	400	20-44-1	P488N-047		BC6S47J	ACE6147	4SE-S47	

Note 1. Some versions may use 1000mmf in this application (Part #15-10216).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2.2meg	½	24-330-0	BT-174		Q18-139X	UDT-295	Loudness, Tap ⓐ 250K & 300K
B	Switch			KB-1 or KR-1*		76-1	US-26	
R2A	500K	½	24-173-2	F1-41			■UE3897	Bass
B	3meg	½		R2-79				Treble

* Use KR with "CRL Red Label" controls and KB with "Blue Label" controls.
■ "STA-LOC" Equivalent: FC55A, OS1750, RU36L, IS2187.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R3	22K		60-22301	
R4	2.2meg		60-22502	
R5	150Ω		60-15101	
R6	2.2meg		60-22503	
R7	47K		60-47302	
R8	5.6meg		60-56501	
R9	330K		60-33401	
R10	1.5meg		60-15501	
R11	4.7meg		60-47501	
R12	22K		60-22301	
R13	1meg		60-10501	
R14	100Ω		60-10101	
R15	1000Ω	1	60-10211	
R16	33Ω	3	61-10-0	
R17	100K		60-10401	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	82-126-0 ①					
L2	Osc. Coil	10-34-4					
L3	Input IF	10-81-2	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	10-71-2	16-6780	BC-357	13-PC10	RF-4	

① Includes trimmer Part #19-180-0.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	Tone Compensation	18mmf, 27mmf, 4700mmf, 3000mmf, 47K, 330K, 68K	13-18-3	Sprague TCS-14
K2	Audio Coupling Circuit	10000mmf, 10000mmf, 470K, 47K, 470K, 47K	13-16-3	Sprague TS-8

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5800Ω CT	3-4Ω	80-69-1	Z1001	A-2900	AU-608	A-3850	22S47	S-51X	

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	2"x10"	PM	6-8Ω	33-373-4		
SP2	4"	PM	3-4Ω	33-372-4	4A07	
SP3	4"	PM	3-4Ω	33-256-4	4A07	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	SILVERTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.092A	83-1146	1235AH	T100 SD-94 ①	100AT K200 ①	① Silicon Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SILVERTONE PART No.	ASTATIC PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	33-235-0	53-T	GD-J			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SILVERTONE PART No.	JENSEN PART No.	WALCO PART No.	
M3	83-1172	† S-66 or †♦ S-66SD or ♦ S-66D	† W-75TPS or †♦ W-75DS or ♦ W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Tuning Cap.	19-74-2	2 Gang
M5	Switch	69-270-0	Radio-Phono (Rotary, Wafer Type)
M6	Switch	84-4160	Phono, On-Off (Includes Spring #70-247-0)
M7	Motor	59-72	Complete (Record Changer 528.56300)
	Motor	59-89	Complete (Record Changer 528.56310)
	Printed Board	D-25-8-1G	

CABINETS & CABINET PARTS

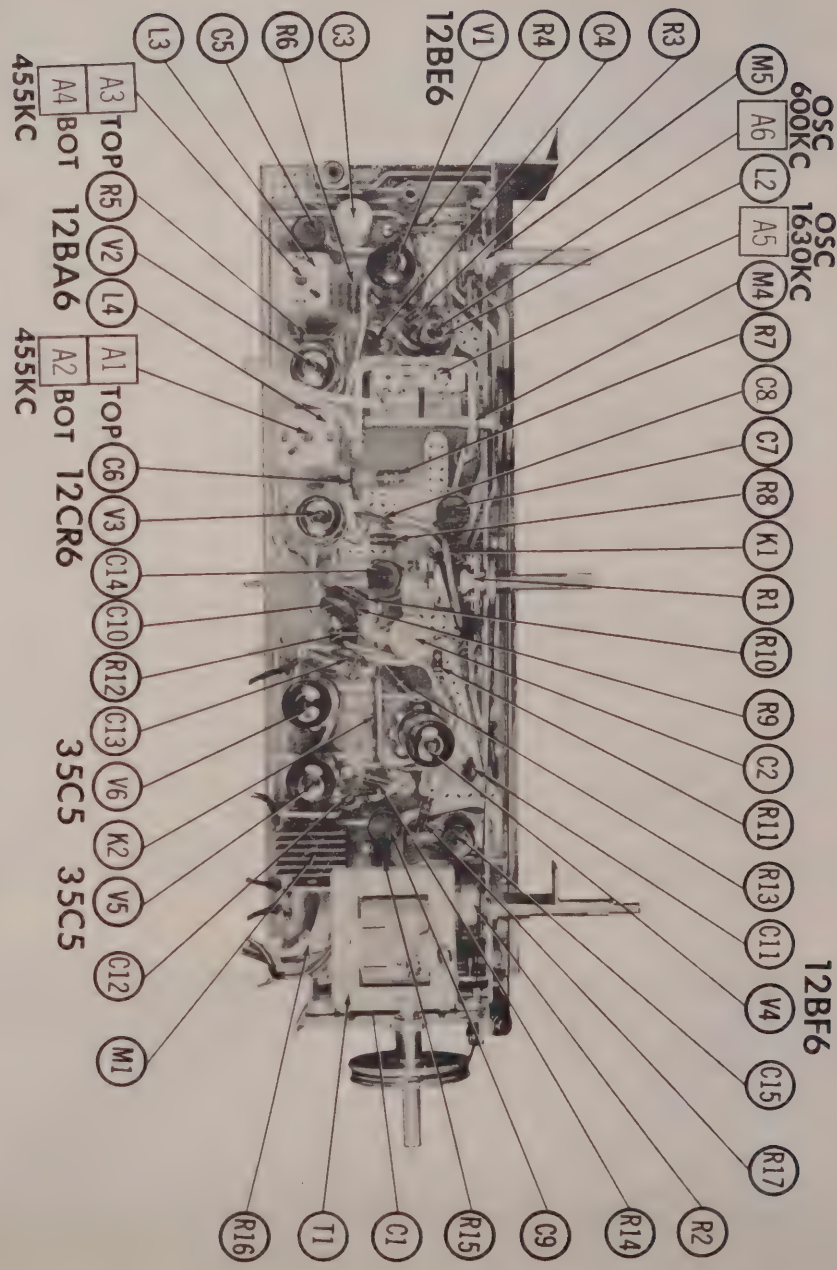
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-1086-0	Tuning
Knob	52-1087-0	On-Off-Loudness
Knob	52-1089-0	Treble
Knob	52-837-0	Bass
Knob	52-1088-0	Radio-Phono
Knob	52-1122-0	Off-On-Reject
Knob	52-917-0	Speed Control
Cabinet	42-64-3	Mahogany, Model 9045
Cabinet	42-65-3	Limed Oak, Model 9046

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—TOP VIEW



PHOTOFACT* Folder

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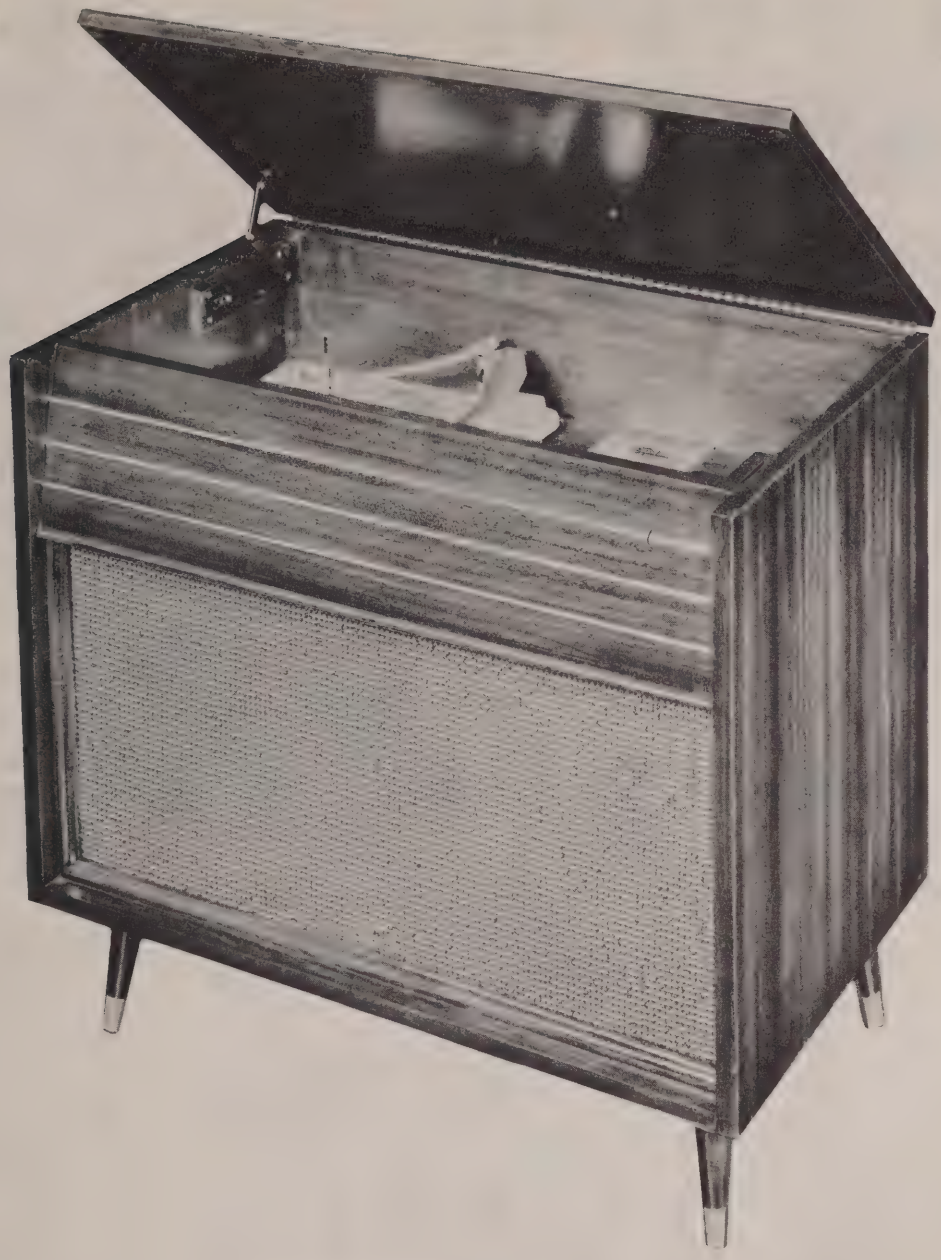
SYMPHONIC
MODELS 1261, 1263

SYMPHONIC
MODELS 1261, 1263



SYMPHONIC
MODELS 1261, 1263

TRADE NAME	Symphonic Models 1261 (Serial #4000 & higher), 1263
MANUFACTURER	Symphonic Radio & Electronics Corp., 235 Jersey Ave., New Brunswick, N. J.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES	Four
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 50 Watts, .54 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE V-M 1200A - PHOTOFACT SET 353 FOLDER 16
OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H828

DATE 3-59 SET 436 FOLDER 16

SET 436 FOLDER 16

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Phase Inv.	6AN8	
V2	Output	6CZ5	Note 1

Note 1. Type 6V6GT used in Model 1261.

ITEM No.	USE	TYPE	NOTES
V3	Output	6CZ5	Note 1
V4	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SYMPHONIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	450	CE-121 ①	AFH4-84	D0620		TMQ-99	Q-410	TVLS-4742. 5*
B	■20	450							
C	▲5	450							
D	25	50							

* ① C1D is not used in some versions (C1 Part #CE-119).
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SYMPHONIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	470		CC-127	BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C3	330		CC-126	BPD-00033	DD-331	L10T33	UC-5333	5GA-T33	
C4	5000		CC-104	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C5	330		CC-126	BPD-00033	DD-331	L10T33	UC-5333	5GA-T33	
C6	330		CC-126	BPD-00033	DD-331	L10T33	UC-5333	5GA-T33	
C7	68			BPD-000068	DD-680	L10Q68	UC-5468	5GA-Q68	①
C8	1000		CC-122S	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C9	220		CC-128	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C10	.1	400	CP-207	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	②
C11	20000		CC-105	BPD-02	DD-203	BYB6S2		5HK-S2	
C12	20000		CC-105	BPD-02	DD-203	BYB6S2		5HK-S2	
C13	20000		CC-105	BPD-02	DD-203	BYB6S2		5HK-S2	
C14	20000		CC-105	BPD-02	DD-203	BYB6S2		5HK-S2	
C15	1.0	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	③
C16	20000		CC-105	BPD-02	DD-203	BYB6S2		5HK-S2	④

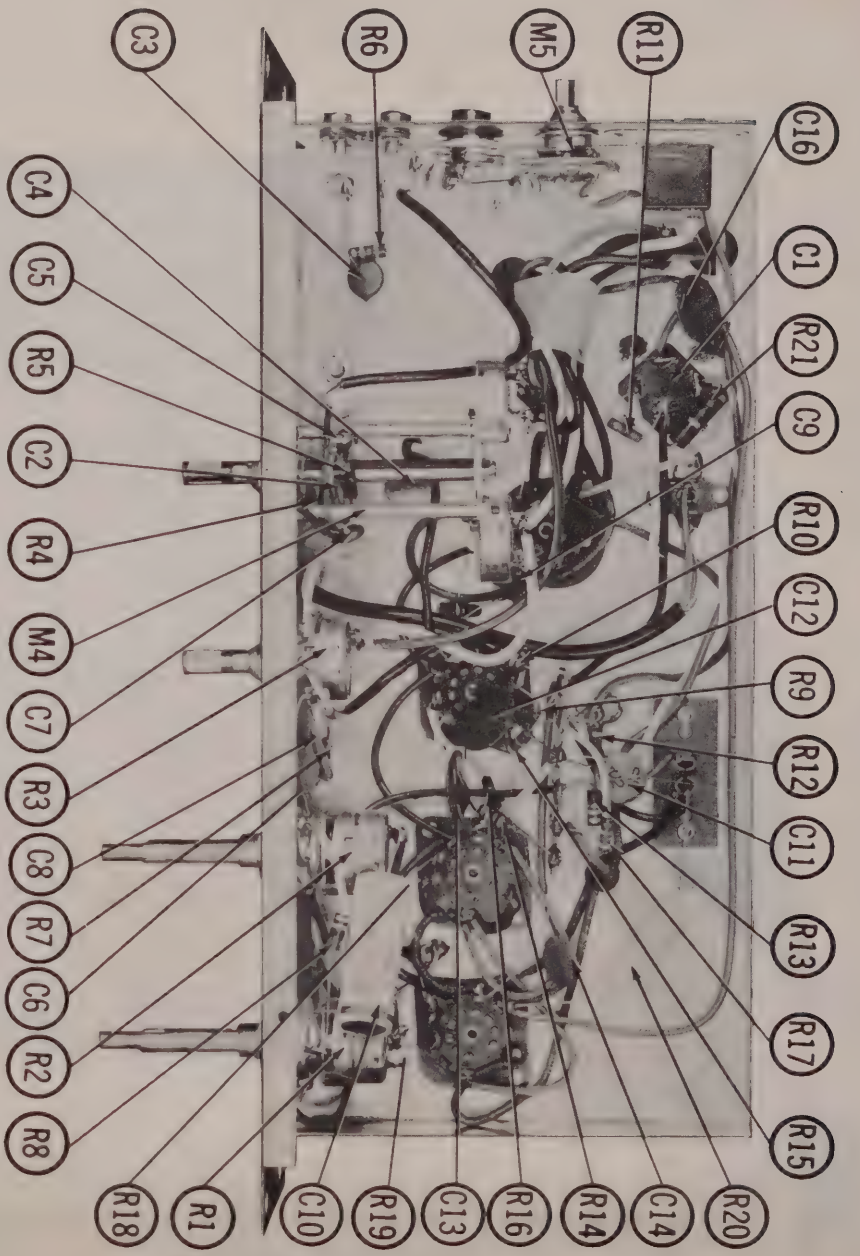
① Some versions may use 56mmf in this application (Part #CC-130).
② Model 1261 uses .05mfd in this application (Part #CP-210).
③ Some versions may use 1.5mfd in this application (Part #CP-105).
④ Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SYMPHONIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3meg	½	VC-200			Q13-140X	UT-457	Loudness, Tap ⓐ 900K
B	Shaft					Not Req.	Not Req.	
C	Switch					76-1	U8-26	Off-On
R2A	500K	½	VC-203 ①					Treble
B	Switch							Treble Boost
R3A	3meg	½	VC-204 ②					Bass
B	Switch							Bass Boost

① Part #VC-201 (No switch) used in Model 1261.
② Part #VC-202 (No switch) used in Model 1261.

CHASSIS—BOTTOM VIEW



PARTS LIST & DESCRIPTION (continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	SYMPHONIC PART No.	NOTES
R4	270K		RC-238	
R5	1meg		RC-211	
R6	470K		RC-216	
R7	100K		RC-225	
R8	100K		RC-225	
R9	3.3meg		RC-229	
R10	270K		RC-238	
R11	1meg		RC-211	Note 1
R12	1000Ω		RC-241	
R13	27K		RC-245	
R14	470K		RC-216	
R15	47K 5%		RC-308	
R16	1200Ω		RC-232	
R17	47K 5%		RC-308	
R18	470K		RC-216	
R19	470K		RC-216	
R20	400Ω	3	RW-32	Note 2
R21	8200Ω	1	RC-509	Note 3

Note 1. Model 1261 uses 820K in this application.
Note 2. Model 1261 uses 270Ω 3W in this application (Part #RW-31).
Note 3. Model 1261 uses 6800Ω 1W in this application (Part #RC-508).

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA SYMPHONIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.55A	630 VCT @.072A	6.3 V @2.1A	TR-131 ①	P9312	P-3151		PC8407		R-9A ②

① Part #TR-130 used in Model 1261 ② Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SYMPHONIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5100Ω CT	6-8Ω	TR-129	Z1402		AU-609①	A-3852	24S64	S-55Z	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SYMPHONIC PART No.	QUAM PART No.	NOTES
SP1	12"	PM	3-4Ω	SP-808 ①	12A6A	① Model 1263 only.
SP2	10"	PM	3-4Ω	SP-805 ①	10A4A	② Two used in Model 1261.
SP3	3½"	PM	3-4Ω	SP-411 ①	3A15TZ3.9	
SP4	3½"	PM	3-4Ω	SP-411	3A15TZ3.9	
	8"	PM	3-4Ω	SP-810 ②		

PHONO CARTRIDGE

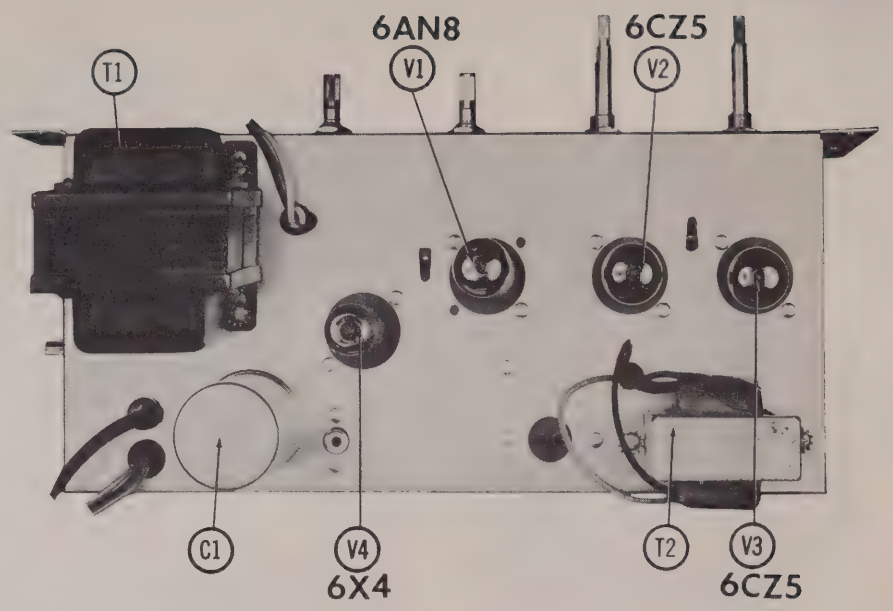
ITEM No.	REPLACEMENT DATA SYMPHONIC PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M1		89-TB				

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA SYMPHONIC PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2		† S-61 or †♦ S-61SD or ♦ S-61D	† W-77TPS or †♦ W-77DS or ♦ W-77TPD	† Jewel ♦ Diamond

CHASSIS—TOP VIEW



MISCELLANEOUS

ITEM No.	PART NAME	SYMPHONIC PART No.	NOTES
M3	Lamp		#47
M4	Switch	SW-116	Input Selector, Rotary, Wafer Type
M5	Switch	SW-114	Speaker Selector, Rotary, Wafer Type

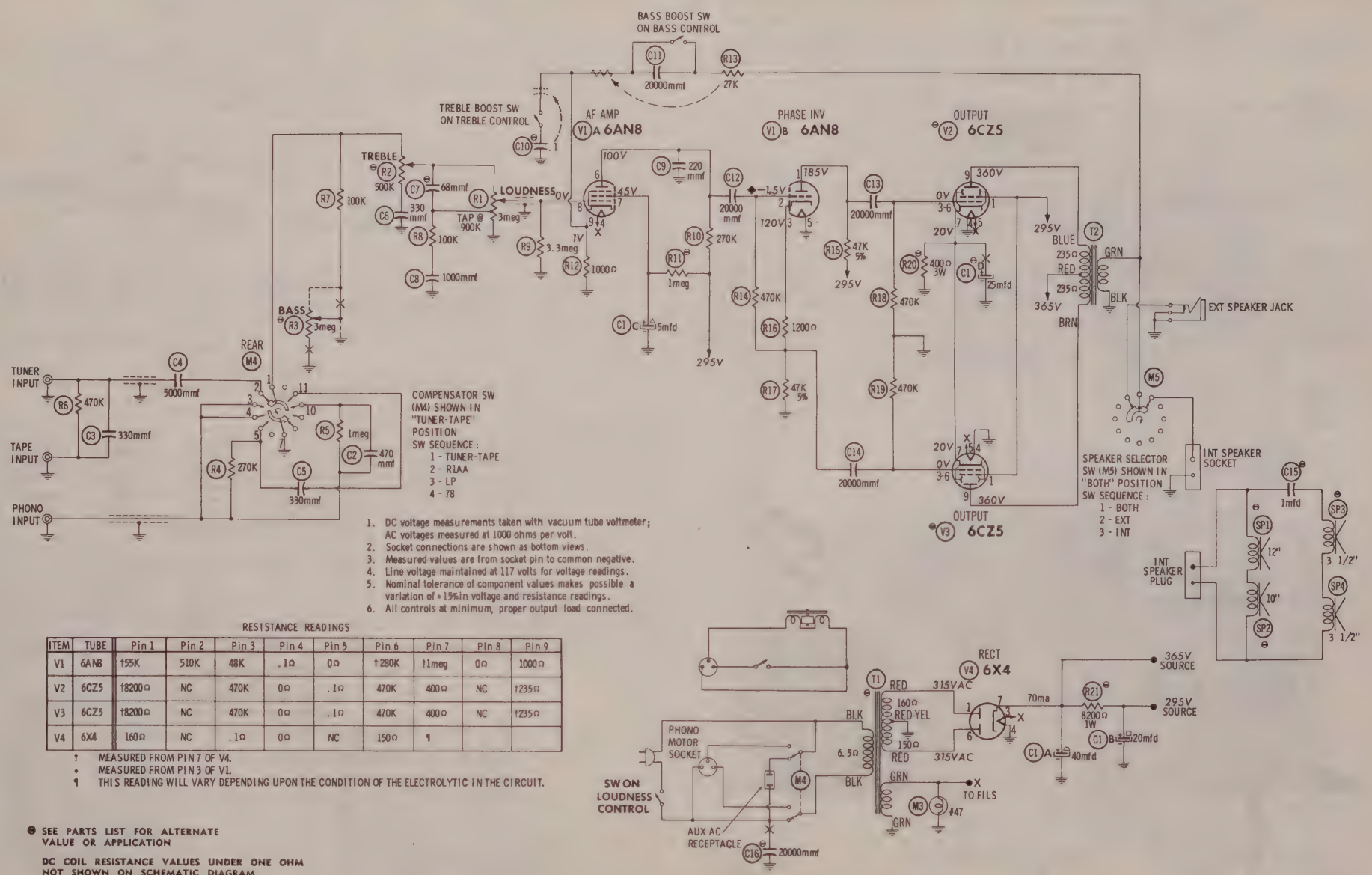
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KN-191	Plain, Mahogany
Knob	KN-200	Mahogany, 2 Used
Knob	KN-236	4 Used, Model 1261
Knob	KN-237	2 Used, Model 1263

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AN8	†55K	510K	48K	.1Ω	0Ω	†280K	†1meg	0Ω	1000Ω
V2	6CZ5	†8200Ω	NC	470K	0Ω	.1Ω	470K	400Ω	NC	†235Ω
V3	6CZ5	†8200Ω	NC	470K	0Ω	.1Ω	470K	400Ω	NC	†235Ω
V4	6X4	160Ω	NC	.1Ω	0Ω	NC	150Ω	¶		

† MEASURED FROM PIN 7 OF V4.
• MEASURED FROM PIN 3 OF V1.
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SYMPHONIC MODELS 1261, 1263

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TRAV-LER MODELS 8051, 8052, 9065, 9070, 9074, 9075, 9076, 9077, 9078

TRAV-LER MODELS 8051, 8052, 9065, 9070, 9074, 9075, 9076, 9077, 9078

TRAV-LER MODELS 8051, 8052, 9065, 9070, 9074, 9075, 9076, 9077, 9078

TRADE NAME	Trav-Ler Models 8051, 8052, 9065, 9070, 9074, 9075, 9076, 9077, 9078
MANUFACTURER	Trav-Ler Radio & Tel. Corp., 571 W. Jackson Blvd., Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Three)	Types 12AX7 AF Amp.-Phase Inv., (2) 50C5 Output
POWER SUPPLY	110 - 125 Volts AC-60 Cycles RATING .36 Amp. @117 Volts AC (34 Watts) Less Motor

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR MONARCH UA8- PHOTOFACT SET 381 FOLDER 11 .

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

H719

SET 436 FOLDER 17

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp. -Phase Inv.	12AX7	
V2	Output	50L6GT	
V3	Output	50L6GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA TRAV-LER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	20	300	EC-70 ①	PRS450V20	BR2035	TC65	TD-20-350	MT-4520	TVA-1608
C2A	▲40	300	EC-69 ②	AFH4-02	D0020	FP420.35		T-102	R1898*
B	■40	300				TC77			
C	▲40	300							

① Not used in Models 8051 & 8052.
② Models 8051 & 8052 use 40-40-40mfd ⓐ 150V (Part #EC-29).
* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA TRAV-LER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C4	270				D6-271	5R5T27		MS-327	10%
C5	680				D6-681	1R5T68		MS-368	10%
C6	2000					1R5D2	MCB457	MS-22	10%
C7	2000					1R5D2	MCB457	MS-22	10%
C8	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	.22	400		P488N-22		CUB4P22	GEM-4022	4TM-P22	①
C10	100			N750-DI 100	DTN-100	C10T1U	NT-531	5TCU-T1	N750 10%
C11	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	②
C12	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C13	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C14	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C15	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C16	4700					1R5D47		MS-247	10%
C17	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C18	.1	600		P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	

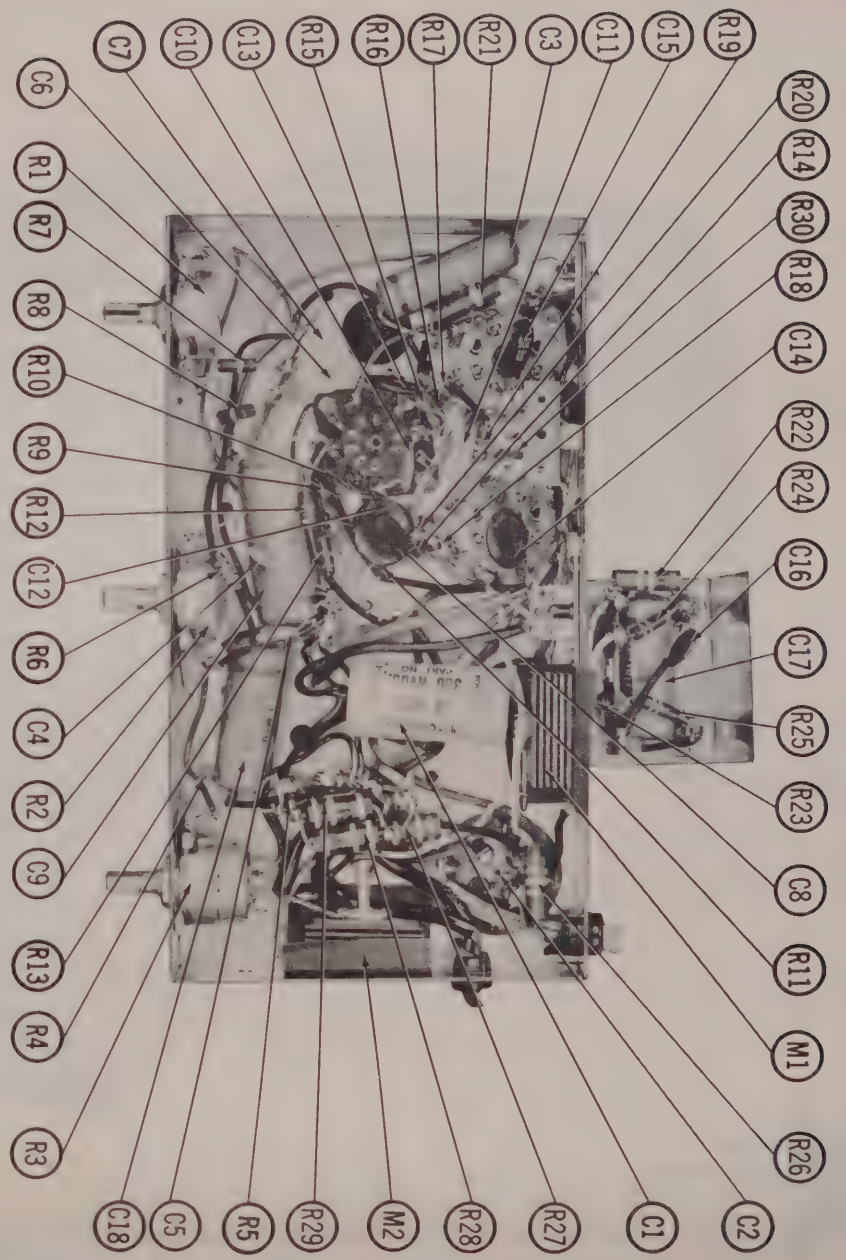
① Models 8051 & 8052 use .1mfd in this application.
② Not used in Models 8051 & 8052.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA TRAV-LER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	3meg	½-½	VC112					Loudness, Tap ⓐ 1meg & 1.5meg
R2A	250K	½-½	VC111	BT-53	A47F1-250K-S	Q13-130X		Treble, Tap ⓐ 125K
B	Shaft			Not Req.	KSS-3	Not Req.		
R3A	5meg	½	VC110	B-88	A47-5meg-Z	Q13-141	U65	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	US-26	Power On-Off

* Use KR with CRL "Red Label" controls and KB with "Blue Label" controls.

CHASSIS-BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	TRAV-LER PART No.	NOTES
R4	1.5meg			①③
R5	100K			
R6	33K			
R7	100K			②
R8	100K			
R9	22meg			③
R10	22meg			④
R11	47K			⑤
R12	270Ω			
R13	15K			⑥
R14	220K			
R15	22meg			③
R16	22meg			④
R17	220K			
R18	270K			
R19	270K			
R20	270K			
R21	220Ω	1		
R22	10K	1		
R23	10K	1		
R24	6.8meg			
R25	6.8meg			
R26	18K	1		
R27	270Ω	1		
R28	47Ω	1		③
R29	47Ω	1		⑦
R30	22Ω	1		

Note 1. Models 8051 & 8052 use 3.3meg
Note 2. Models 8051 & 8052 use 330K
Note 3. Not used in some versions.
Note 4. Some versions use 10meg
Note 5. Not used in Models 8051 & 8052.
Note 6. Some versions use 33K, others use 8200Ω
Note 7. Some versions use 22Ω

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.[1]	REPLACEMENT DATA TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	6500Ω CT	8Ω	AT-26 ①							① Used in Models 9065, 9070, 9074, 9075, 9076, 9077, 9078
		SEC 2 1-2Ω								
	5600Ω CT	3-4Ω	AT-12A ②	Z1011	A-2935	AU-609	A-3830	24S55	S-55X	② Used in Models 8051, 8052

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA TRAV-LER PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	SPK-27 ①	6A1	① Used in Models 9065, 9070, 9074, 9075
SP2	6"	PM	3-4Ω	SPK-27 ①	6A1	② Used in all models.
SP3	2"x6"	Electrostatic		SPK-54 ②		
SP4	2"x6"	Electrostatic		SPK-54 ②		
	5"	PM	3-4Ω	SPK-36 ③	5A07	③ Models 9077, 8051, 8052 use 2 in parallel.
	10"	PM	3-4Ω	SPK-61 ④		④ Model 9078 uses 2 in parallel.
	8"	PM	3-4Ω	SPK-60 ⑤		⑤ Model 9076 uses 2 in parallel.

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA TRAV-LER PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.053A	SR-11 ①	1235AH	T150 SD-92 ①	100A K200 ①	① Silicon Type
M2	.053A	SR-11 ①	1235AH	T150 SD-92 ①	100A K200 ①	

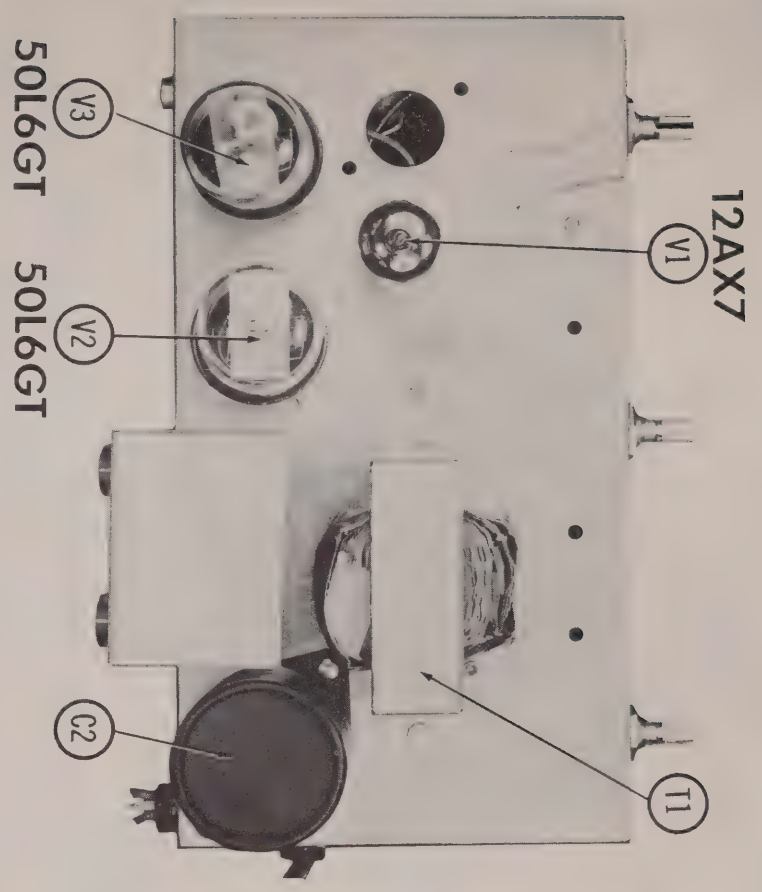
① In Models 8051 & 8052 M2 is not used (M1 Part #SR-4).

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA TRAV-LER PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	JENSEN PART No. CARTRIDGE	JENSEN PART No. NEEDLE	REMARKS
M3		55-T or 81-TB	GD-J			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—TOP VIEW



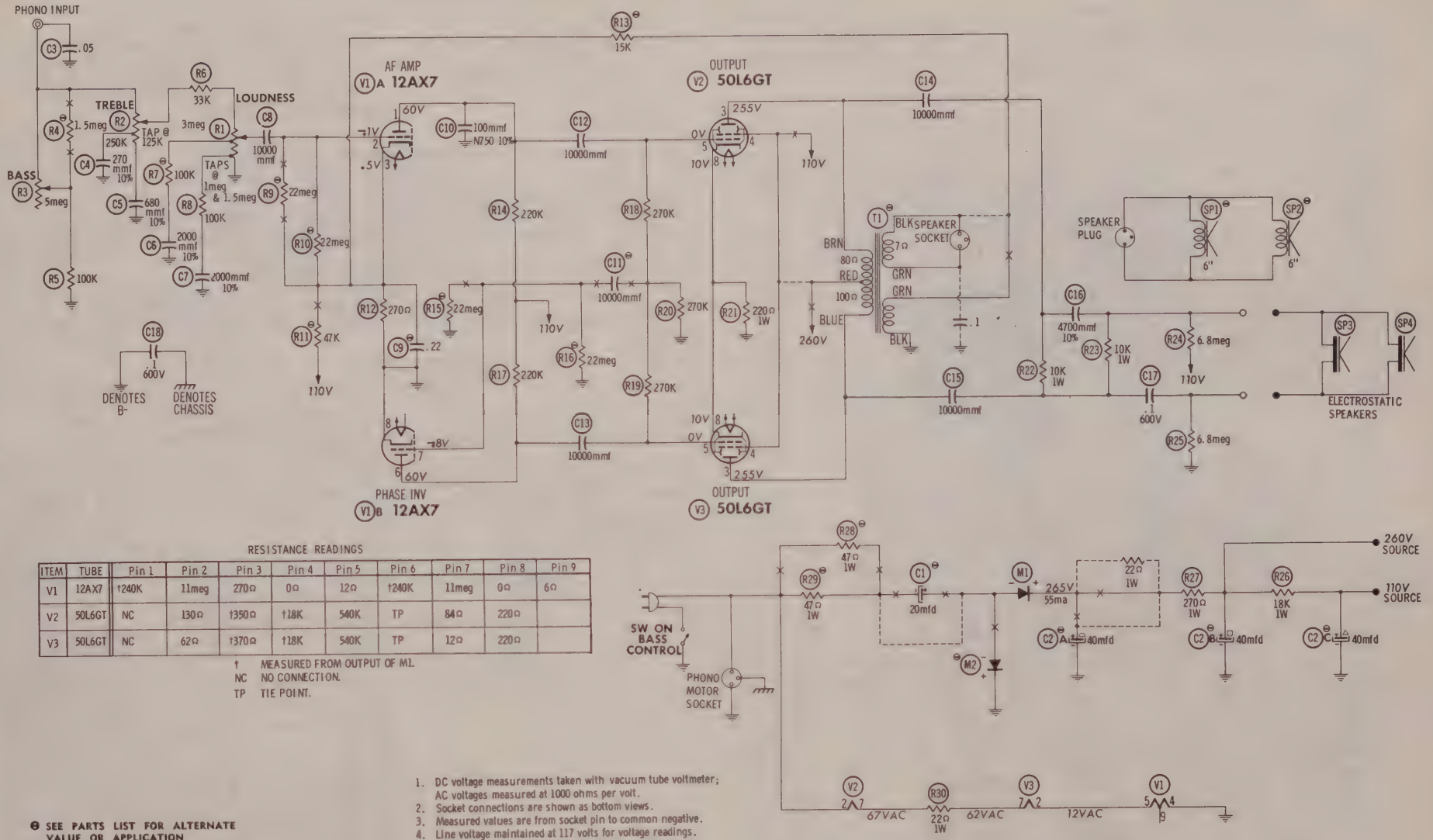
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA TRAV-LER PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M4		† S-66 or †♦ S-66SD or ♦ S-66D	† W-75TPS or †♦ W-75DS or ♦ W-75TPD	† Jewel ♦ Diamond

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†240K	11meg	270Ω	0Ω	12Ω	†240K	11meg	0Ω	6Ω
V2	50L6GT	NC	130Ω	†350Ω	†18K	540K	TP	84Ω	220Ω	
V3	50L6GT	NC	62Ω	†370Ω	†18K	540K	TP	12Ω	220Ω	

† MEASURED FROM OUTPUT OF M1.
NC NO CONNECTION.
TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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TRAV-LER MODELS 8051, 8052, 9065, 9070, 9074, 9075, 9076, 9077, 9078

PHOTOFACT* Folder

*TRADE MARK

Howard W. Sams

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

V-M
MODEL 1201

GENERAL INFORMATION

V-M Model 1201 record changer play a stack of records in automatic sequence and shut off after playing the last record.

As many as ten 12-inch, twelve 10-inch, or ten 12-inch and 10-inch records intermixed (all 33 or all 78) may be loaded on the spindle.

A stack of fourteen 7-inch, 45-rpm records (with a 45 adaptor spindle) will also play on this changer.

16 2/3-rpm records with 1 1/2-inch center holes can be played automatically; however, it is not advisable to allow the changer to shut off automatically after the last record has played.

The tone arm is equipped with an extra lead-in to receive a stereo cartridge. A monaural-stereo switch is located on the baseplate. "M" position is used when playing monaural records; "S" position, when playing stereo records.

Records are separated by movement of a finger in the center spindle. This finger directly separates records having a 1/4-inch center hole and actuates the knives and shelves of the spindle used for playing 45-rpm records.

The tripping method is the velocity type, requiring rapid tone arm acceleration to actuate the trip mechanism.

Unless otherwise specified, connect Model 1201 record changers to an outlet supplying 117 volts, 60 cycles AC only.

MANUFACTURED BY:

V-M Corp.
Benton Harbor, Michigan

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V-M
MODEL 1201

V-M
MODEL 1201

SET 436 FOLDER 18

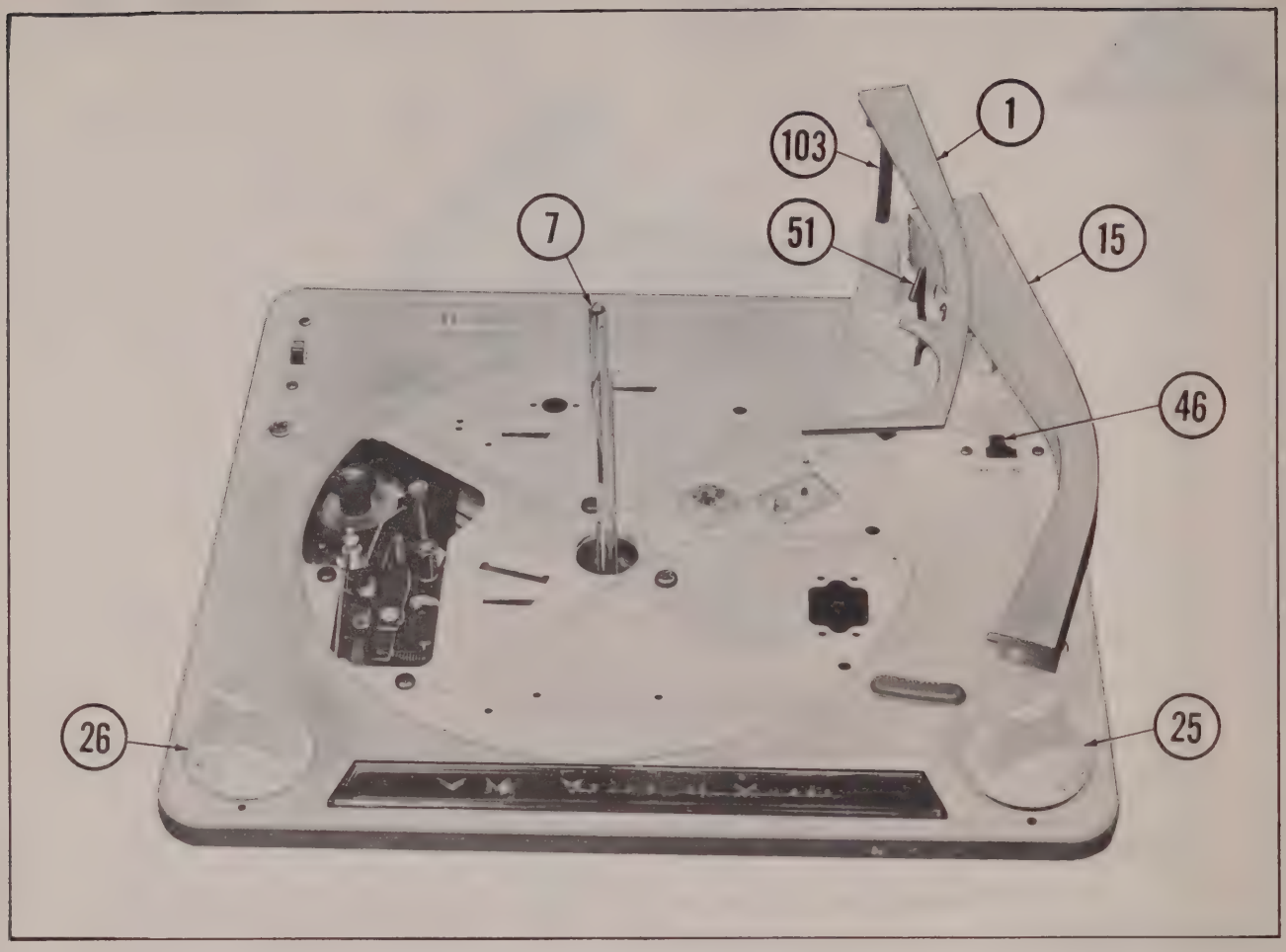

Fig. 1. Top View With Turntable Removed.

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OPERATING INSTRUCTIONS

Loading

1. Pull straight up on record support (1) until it clears the spindle. Then swing the record support out over the tone arm.

2. Place records on spindle and lower to offset shelf. Hold records level and replace record support over spindle.

Fig. 2. Bottom View of Changer.

Starting

Make sure the stylus and speed controls are in the position corresponding to the type of records to be played. Then turn Off-On-Rej. knob to Rej. and release. The changer will play and change each record, and shut off automatically after the last record has been played.

Rejecting

To reject a record at any time while changer is operating, turn Off-On-Rej. knob to Rej. and release.

Unloading

Lift record support clear of spindle and swing out over tone arm. Using both hands, and with fingers under the edge of the bottom record, lift records straight up and off of spindle.

Manual Operation

Records without starting and fast-finishing grooves must be played manually. To play records manually, lift the record support arm and swing it to the right until it clears the turntable. Place record on spindle and lower to the turntable. Turn changer control knob to On position only. Gently place needle on record.

CHANGE CYCLE

Observe the change cycle operation while manually rotating the turntable. The following description can then be readily followed, and the function of each part more easily understood.

This changer has a velocity trip mechanism. The change cycle is started by the faster inward motion of the tone arm when the needle enters the trip grooves at the end of a record. Only records having fast-finishing grooves will operate this trip.

The tone arm and trip finger cam and shaft assembly (68) are connected so that they move in unison. As the tone arm nears the end of a record, trip finger cam (68) pushes trip link (95), engaging and pivoting trip lever (94). As trip lever (94) pivots, pawl lever (92) pivots with it and carries the trip pawl toward the turntable hub. While a record is playing, the small motions of the trip pawl are not sufficient to cycle the mechanism because, on each revolution of the turntable, the wiping contact by the hub projection moves the trip pawl back.

When the needle enters the record lead-out groove, the trip pawl is moved far enough to definitely engage the projection on the turntable hub. The con-

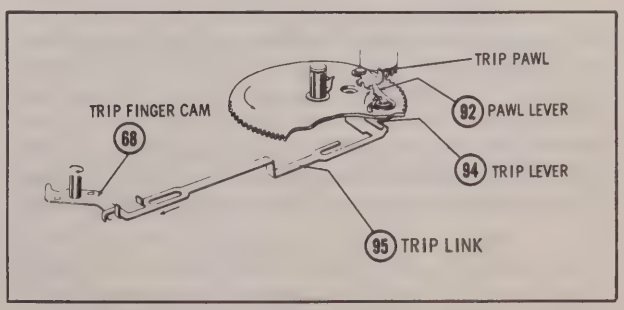


Fig. 3. Trip Mechanism Parts.

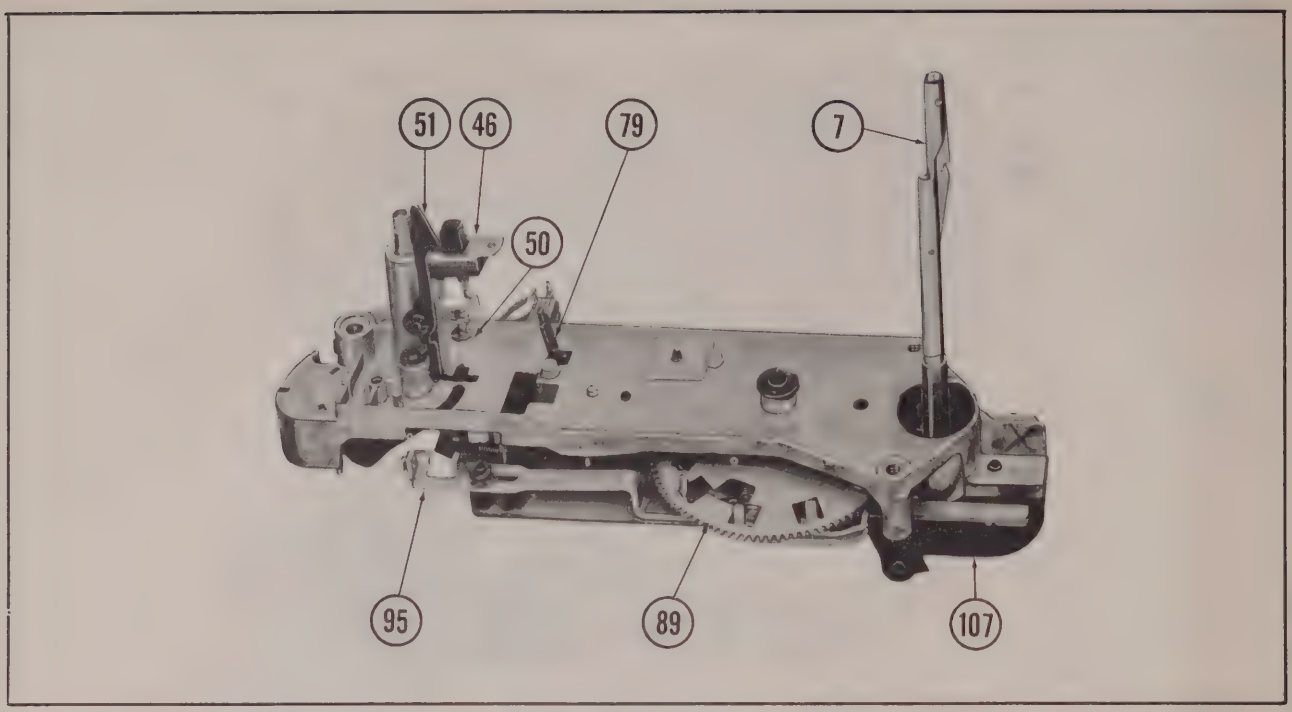


Fig. 4. Top View Of Cycling Mechanism.

tact between the trip pawl and turntable hub projection gives the necessary push for the teeth in main gear (89) to engage the teeth in the turntable hub, causing main gear (89) to rotate. This action starts the lateral travel of slide assembly (97). Slide assembly (97) is moved toward the rear by an eccentric mounted pin on main gear (89). This pin rides in the cross slot in slide assembly (97).

As the slide assembly begins to move, lift pin (23) rides up the incline on the rear of slide assembly (97), raising the tone arm. At the same time, trip finger cam (68) is pushed upward by lift pin spring (71), causing the two formed dimples in the trip finger cam to engage the two holes in tone arm return locator (64). This action controls the movement of the tone arm during the change cycle.

Slide assembly (97) continues to move away from the spindle until the formed end of slide (97) pushes against tone arm return locator (64). This action moves the tone arm out over tone arm rest (28).

A tab on the front of slide assembly (97) now contacts ejector bracket assembly (107). Ejector bracket (107) moves push rod (76) upward to acutate spindle assembly (7), dropping a record to the turntable.

Simultaneously, the trip pawl on top of main gear (89) contacts and rides along the curved finger of retard assembly (86). After leaving the finger of retard assembly (86), the trip lever assembly comes in contact with the trip link guide rivet. This action cams the pawl into the trip position again; however, before the change cycle is completed the trip pawl is reset by the tab located near the cross slot in slide (97).

At this time, the cam surface of the bracket on top of main gear (89) moves reset lever (81) to its midposition (10" setdown), where reset lever (81) is held by 12" record selector (51). Slide assembly (97) continues to the rear and then starts forward.

If 7" records are being changed, rubber bumper (54) and 7" setdown lever (79) are free to move upward. This action raises reset lever (81) to the upper position (7" setdown).

If 10" records are being changed, 7" setdown lever (79) will not rise, because rubber bumper (54) will contact the edge of the 10" record. Consequently, reset lever (81) remains in the midposition (10" setdown) as originally placed by the camming action of the bracket on top of main gear (89).

When a 12" record drops to the turntable, the record strikes 12" record selector (51) and pivots the selector toward the rear of the changer. This action disengages the end of reset lever (81) from the edge of 12" record selector (51) and permits reset lever (81) to drop into the recess at the bottom of 12" record selector (51). Reset lever (81) then engages the bottom step of tone arm return locator (64), positioning the tone arm for 12" setdown.

As slide assembly (97) continues forward, the tab on the rear of the slide moves clear of tone arm return locator (64) and trip finger cam (68), which are still locked together. This action permits tone arm return spring (61) to move the tone arm inward until one of the three setdown steps in tone arm locator (64) strikes reset lever (81), stopping the inward travel of the tone arm directly above the point of landing. The tone arm is then lowered to the lead-in groove of the record as lift pin (23) rides down the incline on the rear of slide assembly (97). As pressure is released from lift pin spring (71), trip finger cam (68) and tone arm return locator (64) separate, permitting the tone arm to track freely across the record.

After the record has played and the mechanism trips, the preceding sequence of cycling and playing of

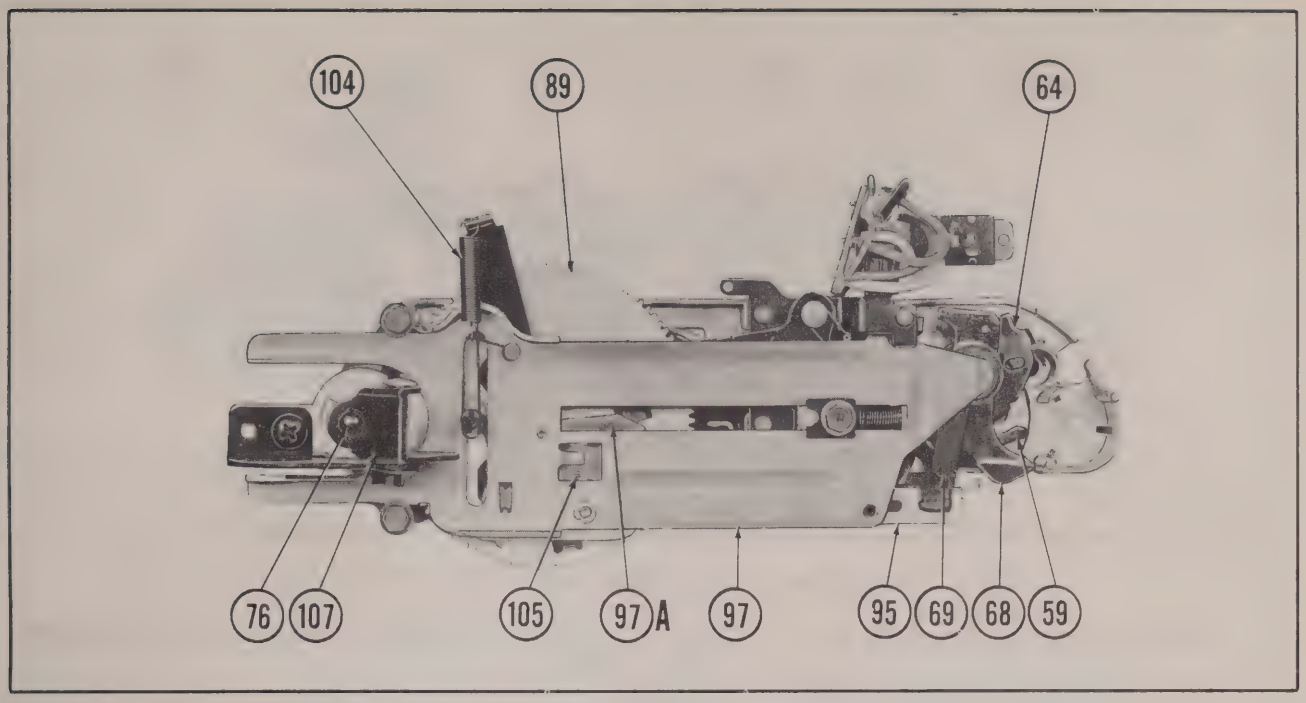


Fig. 5. Bottom Biew Of Cycling Mechanism.

records is again followed until only the last record of the stack remains on the spindle shelf.

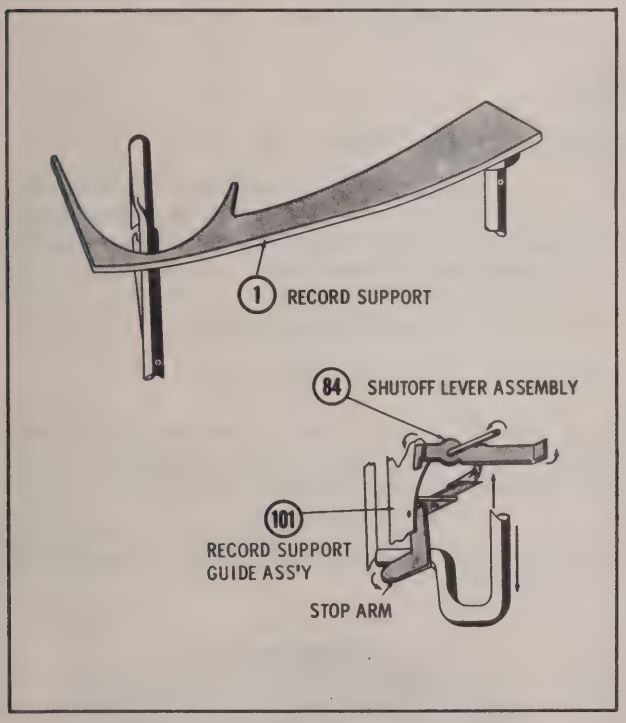


Fig. 6. Shutoff Mechanism Parts.

As the last record of the stack drops to the turntable, record support (1) drops below the shelf on spindle assembly (7), and the lower end of record support shaft (103) contacts the stop arm on record support guide assembly (101). The stop arm in turn applies force to shutoff lever (84). At this moment, cycling slide (97) is in its outermost position (away from the spindle), and the end of shutoff lever (84) is forced against escape lever (97A), preventing shutoff lever (84) from lowering further.

As cycling slide (97) returns to the out-of-cycle position, the end of shutoff lever (84) slides off escape lever (97A), permitting the end to extend down through the slot in the cycling slide. By this time, tone arm locator (64) has rotated too far to be blocked by shutoff lever (84), and the tone arm is permitted to land on the record.

After the last record has played, the mechanism again goes into cycle. When cycling slide (97) has reached its outermost position, the force applied to shutoff lever (84) from record support shaft (103) causes the end of shutoff lever (84) to extend through the slot in cycling slide (97). The other end of shutoff lever (84) rises and prevents tone arm locator (64) from rotating. This action positions the tone arm directly over tone arm rest post (28).

As cycling slide (97) moves back toward the spindle, trip link (95) pushes control lever (59), actuating power switch (60). Thus, power is removed from the motor, stopping the mechanism.

As slide assembly (97) returns to the out-of-cycle position, lift pin (23) rides down the slide incline and lowers the tone arm onto rest post (28).

LUBRICATION

Additional lubrication should not be required for the life of the changer. However, if the changer has had extreme usage, or if parts are replaced, lubricate as follows:

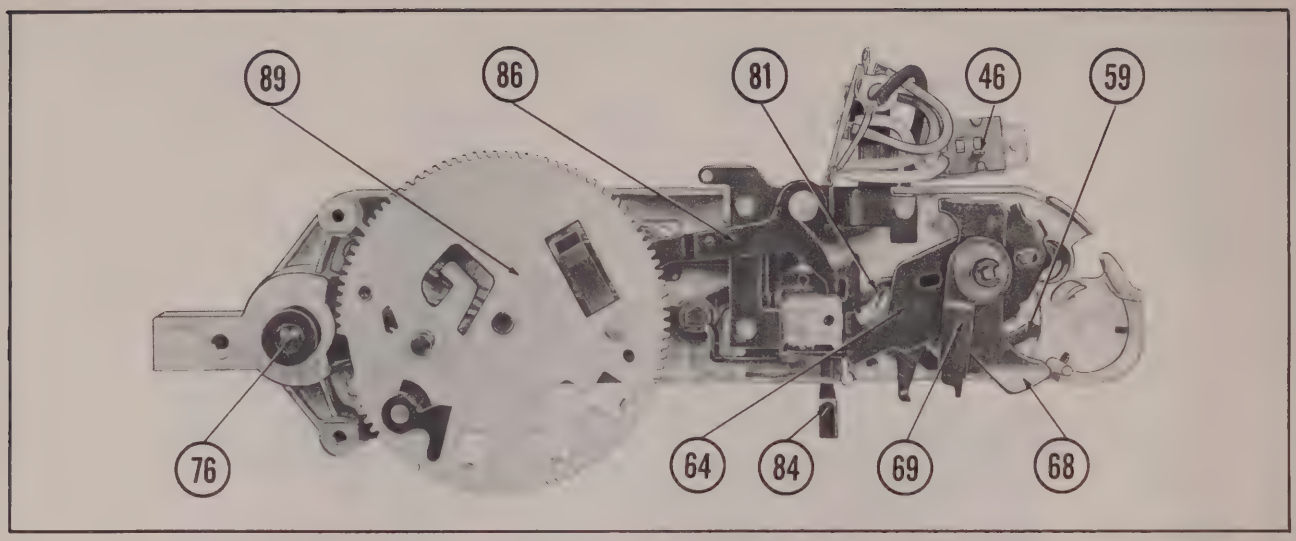


Fig. 7. Bottom View Of Cycling Mechanism With Slide Removed.

Apply Andok "B" or Texaco Sta-Put to:

1. Edges of all slots in slide assembly (97).

2. Outer edges of tines on forked end of slide assembly (97).

3. Lift pin cam surface on slide assembly (97).

4. Lower surface of tone arm return locator (64).

5. Inner surface of tab on rear of slide assembly (97).

Apply one drop of light mineral oil to:

1. Trip finger cam shaft (68).

2. Push rod (76).

3. Top and bottom motor bearings.

ADJUSTMENTS

Needle Setdown (Refer to Fig. 8.)

The setdown position of the needle is adjusted by setdown adjustment screw (24A). Turn this screw until setdown is correct for a 10-inch record. When 10-inch setdown is correct, the 12-inch and 7-inch setdown will also be correct.

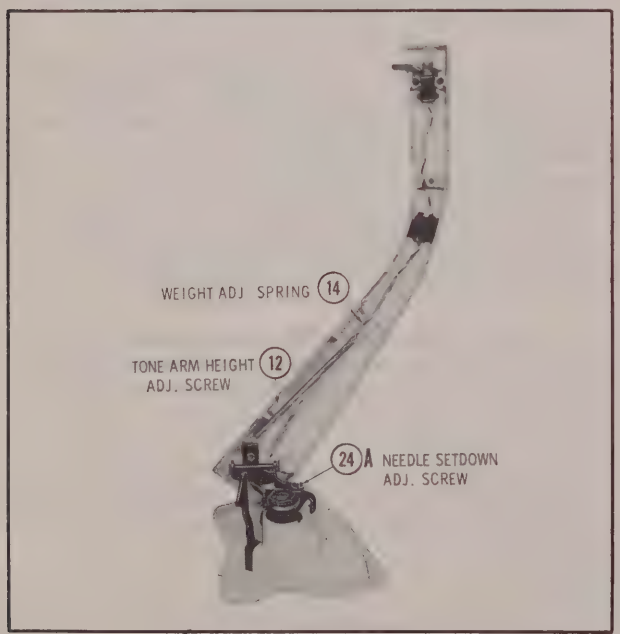


Fig. 8. Tone Arm Adjustment Points.

Tone Arm Height (Refer to Fig. 8.)

The tone arm height is adjusted by lift screw (12). To raise tone arm, turn this screw counterclockwise. To lower tone arm, turn screw clockwise. The tone arm height should be adjusted so that, with a 1 1/8" stack of records on the turntable, the tone arm lifts 1/4" straight up as the change cycle starts.

Needle Pressure (Refer to Fig. 8.)

Needle pressure should be between 6 and 8 grams. To adjust, place weight adjustment spring (14) in the proper slot in the tone arm.

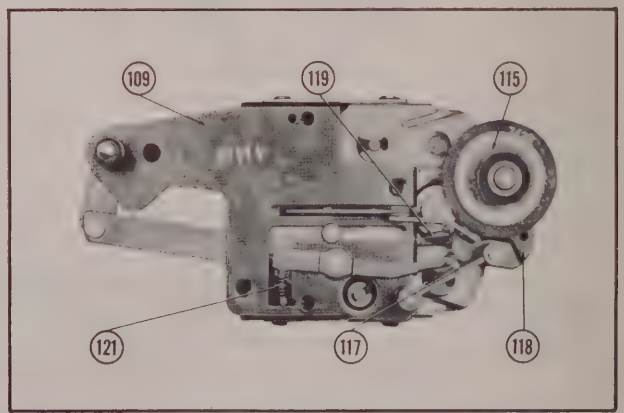


Fig. 9. Top View Of Motor.

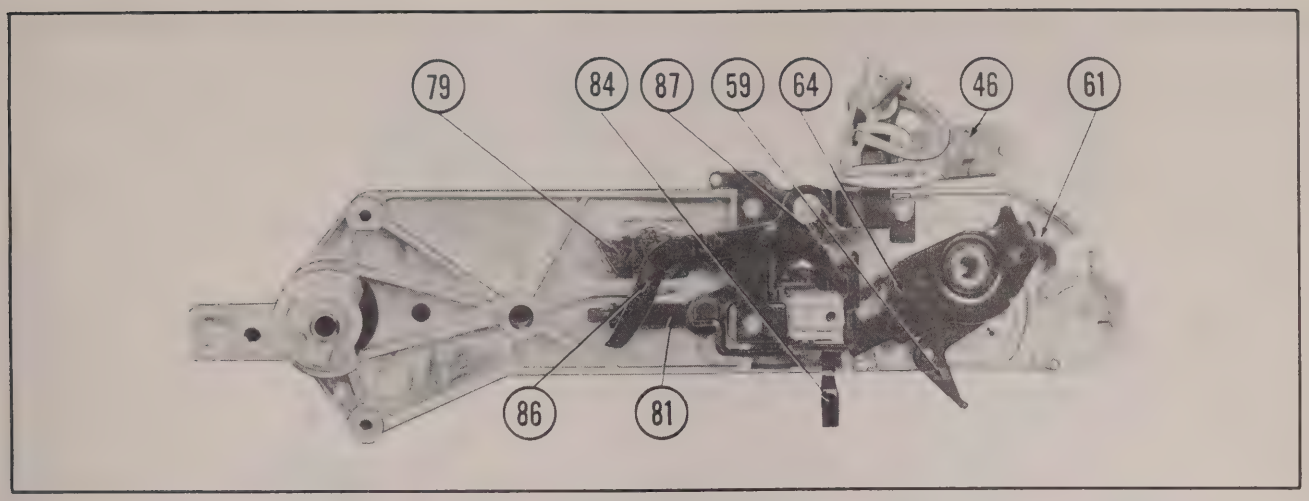


Fig. 10. Bottom View Of Cycling Mechanism With Slide And Cam Gear Removed.

TROUBLE CHART

SYMPTOM	CAUSE	REMEDY
Turntable does not revolve when control is turned to "On" position.	1. No current at motor.	(a) Check that current is reaching AC leads of changer.
		(b) Check that switch is closing.
		(c) Check wiring and soldered terminals in the changer.
	2. Motor defective.	(a) Remove turntable to allow motor to operate without load. If current is reaching motor and drive spindle does not rotate, the motor is defective. Repair or replace.
	3. Motor idler wheel not engaging turntable wheel.	If drive spindle is turning but turntable is not: (a) Check motor idler assembly to determine if it is free to contact the drive spindle and turntable rim. (b) Wipe off inside rim of turntable (4) to remove dust, or if oily, clean the turntable rim and rubber tire of the idler wheel with naptha or alcohol.
Changer does not cycle when the control knob is turned to the "Rej." position.	1. The manual reject not actuating the trip.	(a) Turn control knob (25) to the reject position; hold and see that control shaft assembly (59) has moved trip link (95) to the rear. This should actuate the trip pawl on main gear (89) which will bring the spur on the trip pawl in contact with the gear on the turntable hub. (b) Check for binding of pawl lever (92), trip lever assembly (94) and the trip pawl. If binding occurs, clean out all foreign matter and check for freedom.
Control knob cannot be turned to "On" position.	1. Machine shut off during cycle.	Turn the turntable clockwise, by hand, until control knob (25) is free.
Tone arm strikes records on spindle when it raises, or tone arm rest when it moves out.	1. Tone arm height not adjusted properly.	(See instructions for adjusting tone arm height under "Adjustments".)

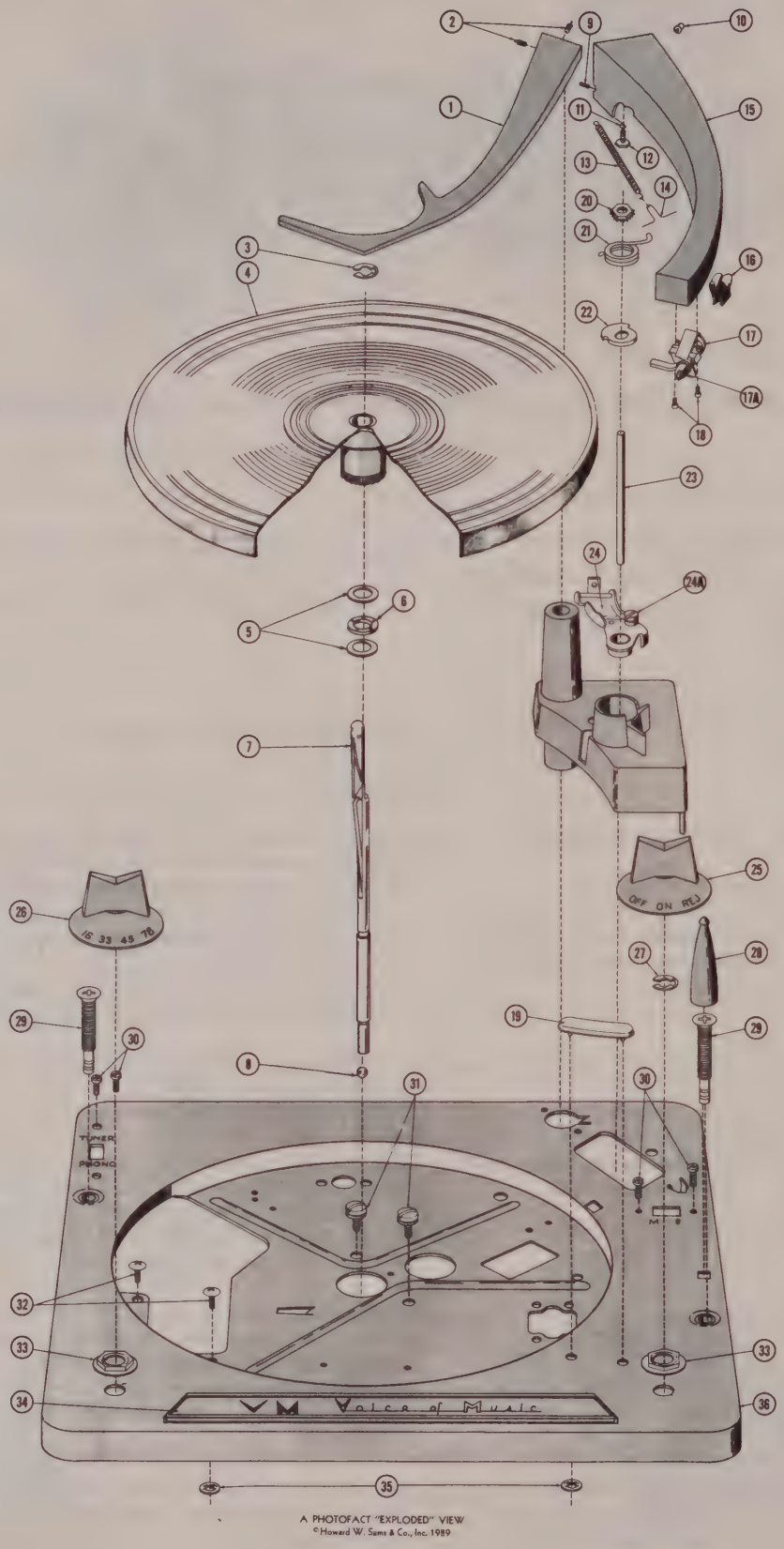


Fig. 11A. Exploded View Of Parts Above Baseplate.

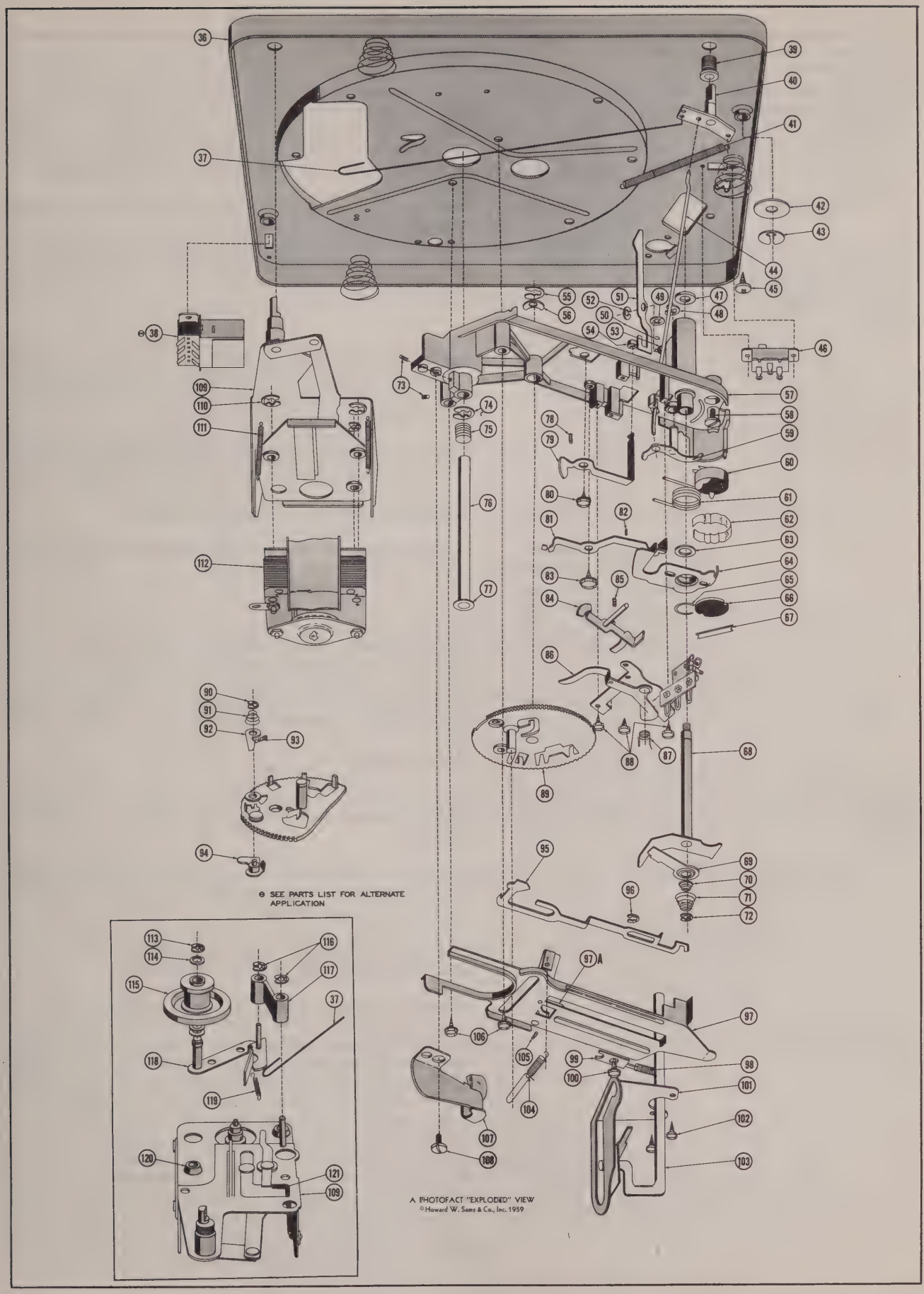


Fig. 11B. Exploded View Of Parts Below Baseplate.

TROUBLE CHART (Con't.)

SYMPTOM	CAUSE	REMEDY
Turntable speed too slow (refer to exploded view).	1. Binding in turntable bearing.	Check the turntable bearing for freedom. Hold the motor idler wheel out of engagement with the turntable and spin the turntable, by hand, to see if it turns readily and coasts for a long time. If binding occurs, remove turntable, clean off foreign matter, and lubricate with light mineral oil.
	2. Line voltage too low.	The line voltage should not be less than 105 volts or the turntable may be too slow.
Turntable stalls or slows down during cycle; refer to exploded view.	1. Motor idler not engaging turntable.	(See "Turntable Does Not Revolve When Control Knob is Turned to 'On' Position" .)
	2. Binding in drive mechanism.	Hold idler away from turntable, or remove idler wheel. Cycle machine by turning turntable slowly by hand. The main gear should turn freely for the complete revolution without binding at any point. (a) If binding occurs, check for foreign matter in the gear teeth, a bent gear bearing, or bent spindle bushing. Straighten or replace. Clean and lubricate.
	3. Binding between pick-up arm lift pin (23) and lift pin cam surface on slide and cam assembly.	Lift pin should ride freely on cam surface without binding.
	4. Motor weak.	When everything checks all right, but the changer still stalls in cycle, the motor may be weak.
	5. Grease on idler wheel.	Wipe off idler wheel rubber tire, inner rim of turntable and motor pulley with naptha or alcohol.
	6. Idler wheel tension spring weak.	Replace spring.
Changer continues to cycle.	Reject mechanism binding.	(a) Make certain trip link (95) is not frozen in the reject position. (b) Make certain changer control lever (59) is not binding and that it actuates trip link (95) when the changer control knob (25) is turned to reject. (c) Check for binding of trip pawl, trip lever (94) and pawl lever (92); these must be free to turn easily. (d) Check the changer control linkage, (44) and (59).
Noise during playing of record.	1. Motor rumble.	If a low-pitched rumbling sound comes from the loud speaker while a record is being played, check motor grommets to be sure the motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float. Motor rumble may also come from an unbalanced motor rotor; in this case, replace the motor.
	2. Defective turntable bearings (6).	Defective turntable bearings can cause rumble. Check for foreign matter in the bearing; also check for defective balls, binding between balls and ball retainer, and rough surface on washers. Clean ball bearing, sleeve bearing, and washers; lubricate with light mineral oil.

TROUBLE CHART (Con't.)

SYMPTOM	CAUSE	REMEDY
	3. Defective motor idler	A rapid thumping sound while the motor is running may indicate a flat spot on the motor idler wheel. If this condition does not clear up after ten minutes of running time, remove the turntable and check the rubber tire on the idler. If the surface of the rubber tire is not smooth and even, replace the part. Should the bearing of the idler wheel show signs of excessive wear or be extremely wobbly, the idler wheel should be replaced.
	4. Turntable scrapes.	If a scraping sound occurs as the turntable revolves, check; (a) Turntable warped, causing outer rim to rise and fall. (b) Motor idler or mounting plate bent.
	5. Squeaks.	Squeaking sound as changer operates indicates lack of oil. Lubricate points indicated under "Lubrication".
Changer does not shut off after last record has been played.	1. Record support (1) binding.	The record support must drop below the off-set shoulder of the spindle or the changer will not shut off.
	2. Lever assembly (84) binding.	Clean out dirt and make sure lever operates smoothly.
	3. Shut-off bracket binding.	Check bracket and if bent, straighten.
	4. Shut off lever not engaging locator.	Adjust tab on slide that rotates the locator and trip finger when unit is cycling.
Rough tone arm motion.	1. Horizontal defects.	(a) Check tone arm return locator (64) for tightness. (b) Check that tone arm return spring (61) is not weak and is hooked up properly.
	2. Vertical defects.	(a) Lift pin (23) binding; clean out dirt and lubricate. (b) Slide and cam (97) binds; check bearing points — clean and lubricate. (c) Burrs in main slot in slide and cam (97) — remove with fine file. (d) Ejector lever on ejector bracket assembly (107) binding. Straighten, remove burrs, and lubricate. (e) Tone arm shaft and sleeve binding; clean and lubricate.
Noise during change cycle.	1. Tines on the forked end of the slide and cam assembly (97) bent.	Replace.
	2. Lack of lubrication. Grinding noise.	Lubricate ejector lever (107) where it contacts lower end of push rod (76).
Shuts off when last record drops.	1. Shut-off bracket (101) bent.	Straighten or replace.
	2. Record support bent.	Bend record support (1) until parallel with baseplate.
	3. Loose shut-off lever assembly (84).	Tighten
	4. Escape lever spring 105 missing.	Replace.

TROUBLE CHART (Con't.)

SYMPTOM	CAUSE	REMEDY
Record does not drop when changer cycles.	1. Spindle push rod (76) broken, or bent.	Replace push rod (76).
	2. Record finger in spindle not moving far enough to eject a record.	The record finger should move forward until it has reached a point flush with, or a maximum of, .010 beyond the spindle body (7). To insure that the record finger is all the way forward, push rod (76) should be raised high enough by the ejector lever to slightly compress the pusher spring. (See "Turntable Stalls During Cycle".) If the spring is compressed and the record finger does not move far enough forward to eject a record, the spindle (7) should be replaced. If a record is not pushed completely off the ledge it may hang on the spindle momentarily, then drop on the tone arm when it moves in over the turntable.
	3. Check that ball bearing (8) is not missing.	Replace.
Two records drop at once.	1. Hole in record too large.	Check the diameter of the hole in the record. An oversize hole will cause two records to drop at once.
	2. Spindle guide not fully down.	If the spindle guide is not all the way down, more than one record may drop at a time. (a) Check the guide to be sure it is free and does not bind at any point. Clean out foreign matter or straighten if necessary. Do not oil. (b) When records are placed on the spindle, be sure the guide is all the way down. The guide will normally raise as a record is being dropped, but it should return to place immediately, by gravity.
	3. Slight play in spindle (7).	Tighten spindle set screw (73).
Record hits tone arm.	1. Record finger not moving far enough forward to eject record.	(See "Record Does Not Drop When Changer Cycles".)
	2. Record finger extending beyond outside diameter of spindle.	Cycle changer, by hand, until pusher shaft is at the top of its travel. Using new record as a gauge, pass it over the spindle to see if it binds at any point. File off high points on record finger with a fine file, until record will pass freely over spindle.
	3. Tone arm not adjusted ed properly.	(See "Adjustments".)
Needle does not set down on 10" record in proper position.	1. Tone arm not adjusted properly.	(See "Adjustments".) (a) Loose nut (20) on pickup arm shaft and sleeve (68).
	2. Tone arm shaft and sleeve (68) binding.	File off burrs and rough surfaces. Polish and lubricate shaft.
	3. 7" set-down lever (79) and 12" record selector (51) not operating properly.	Insure that the proper operation and reset of the 7" set-down lever (79) and 12" record selector (51) is not being interfered with.

SYMPTOM	CAUSE	REMEDY
	4. Needle bent.	Replace with new needle.
	5. Wire spring (50) broken.	12" record selector (51) does not cock; check for broken 12" record selector spring (50).
	6. Bent tone arm return locator (64).	Straighten or replace.
	7. Bent trip finger cam (68).	Straighten or replace.
Needle does not set down on 12" record in proper position.	1. Diameter of 12" record undersize.	The set-down position of the needle for 12" records is determined by the edge of the record striking the 12" record selector (51). If a 12" record has a diameter of less than the standard size of 11-7/8" plus or minus 1/32", it may fail to depress the 12" record selector far enough.
	2. Enlarged center hole in record.	An enlarged center hole might fail to set the 12" record selector because it could produce the same effect as a small record.
	3. Tone arm not adjusted properly.	(See "Adjustments".)
	4. Binding of tone arm shaft and sleeve (68).	Clean and polish shaft (68) and lubricate with light oil.
	5. Reset lever spring (82) broken.	Replace spring (82).
	6. 12" record selector spring (50) broken.	Replace spring (50).
	7. 12" record selector (51) binding.	The 12" record selector must be free to operate smoothly. Clean out dirt and straighten if bent, or replace.
	8. Bent tone arm return locator (64).	Straighten or replace.
	9. Bent trip finger cam (68).	Straighten or replace.
Needle does not set down on 7" record properly.	1. 7" set-down lever spring (78) broken or weak.	Replace.
	2. Tone arm not adjusted properly.	(See "Adjustments".)
	3. 7" set-down lever screw (80) loose.	Tighten.
	4. 7" set-down lever (79) hitting frame or baseplate where it goes through hole in frame.	Straighten or replace.
	5. Reset lever (81) bent.	Replace.
	6. 7" set-down lever (79) does not fall into opening in main gear.	Replace.
	7. Bent tone arm return locator (64).	Straighten or replace.

TROUBLE CHART (Con't.)

SYMPTOM	CAUSE	REMEDY
	8. Bent trip finger cam (68).	Straighten or replace.
Changer does not cycle when record has been played.	1. No finishing trip groove on record.	Check record for eccentric trip groove in center of record. Some old records and home recordings do not have this eccentric trip groove.
	2. Needle jumps out of grooves in record.	(a) Check trip pressure; the lateral pressure should not exceed 3 grams, (if pressure is excessive, see "Changer Trips Before Needle Reaches End of Record"). (b) The record may be defective; the finishing groove is often too shallow. Check with a record that is known to be good. (c) The needle point may be damaged or affected by an excessive accumulation of dust, lint, etc; check needle pressure as described under "Adjustments". (d) There may be binding in the tone arm shaft and sleeve assembly (68) or between the tone arm return locator (64) and the trip finger cam (68); (See "Needle Does Not Track Properly Across Record).
	3. Trip pawl binding on gear face.	The trip pawl must be free to move forward and engage the boss on the turntable hub when the trip lever releases it. Check for burrs or foreign matter lodged between the trip pawl and main gear (89). Do not oil as this might collect dirt and gum up the pawl.
	4. Trip finger cam (68) bent.	Straighten or replace.
	5. Trip link (95) bent.	Straighten or replace.
Changer trips before needle reaches end of record.	1. Hole in record too large.	If the hole in the record is too large, the groove may turn eccentric with the spindle and cause premature tripping.
	2. Binding of trip link (95).	With the trip link released, check the trip link for freedom of motion. It should be free to move without binding.
Needle does not track across record properly.	1. Needle may be clogged by accumulation of lint, dirt, etc, or worn.	(a) Clean foreign material from around needle. (b) Check needle to see if the tip is bent or broken. Replace if necessary.
	2. Trip finger cam (68) does not disengage from the tone arm return locator (64) when cycle is completed.	There should be a 1/32" gap between the trip finger cam (68) and the tone arm return locator (64) when the machine is not in cycle.
	3. Check the bearing in the tone arm post for binding.	(a) Check tone arm return locator (64) and trip finger cam (68) for binding (See 2 above).
	4. Pickup leads too tight.	Give the pickup leads enough slack to allow the tone arm to move freely across a record.

PARTS LIST

Ref. No.	Part No.	Description
1	*16805	Record Support
2	14603	Set Screw
3	1650	"C" Washer (Turntable Retainer)
4	*9455	Turntable Assembly
5	6877	Bearing Washer
6	6876	Bearing Retainer
7	6049	Spindle Assembly
8	6884	Spindle Ball
		Tone Arm & Hinge Ass'y.
9	4923	Pivot Screw
10	4922	Hinge Button
11	7634	Lock Spring
12	7635	Lift Screw
13	18923	Hinge Spring
14	15293	Weight Adjusting Spring
15	*16796	Tone Arm
16	6963	Tone Arm Clip
17	16710-A	Cartridge
17A	18639-A	Needle Unit
18	18427	Cartridge Mtg. Screw
19	9375	Needle Protector
20	14498	Keps Nut
21	4937	Safety Spring
22	4339	Safety Plate
23	4327	Lift Pin
24	4072	Hinge Arm Ass'y.
24A		Set Down Adj. Screw(Part of Item 24)
25	*16791	Knob, On-Off-Rej.
26	*16792	Knob, Speed Control
27	1719	"C" Washer
28	*5573	Rest Post
29	15044	Mounting Bolt
30	16558	Screw, Switch Mtg.
31	9823	Screw, Works Ass'y. Mtg.
32	6929	Screw, Motor Ass'y. Mtg.
33	8398	Pal Nut
34	*16799	Escutcheon
35	18635	Speed Nut
36	*18579	Baseplate Ass'y.
37	16810	Retraction Rod
38	15120	Tuner-Phono Switch(Not on all units.)
39	6916	Control Bushing
40	7114	Control Lever Ass'y.
41	7113	Reject Spring
42	6443	Fibre Washer (Mtg. Bolts)
43	1736	"C" Washer (Mtg. Bolts)
44	6919	Reject Rod
45	2916	Screw, Rest Post Mtg.
46	599	Monaural-Stereo Switch
47	2952	Fibre Washer
48	1652	"C" Washer
49	1720	Speed Nut
50	2563	Spring, 12" Record Selector
51	2957	12" Record Selector
52	1588	"C" Washer
53	4172	Spring, 12" Selector
54	2580	Rubber Bumper
55	1719	"C" Washer, Gear Mtg.
56	9762	Spring Washer, Gear Mtg.
57	15451	Frame Ass'y.
58	9823	Screw
59	2284	Control Shaft Ass'y.
60	467	AC Switch
61	9533	Return Spring
62	2931	Fibre Insulating Strip
63	4950	Fibre Washer (Part of Item 64)
64	6405	Locator & Bushing Ass'y.
65	5828	Locator Ring
66	2573	Switch Cover
67	4212	Retainer, Switch Cover
68	15450	Finger & Shaft Ass'y.
69	9557	Retard Lever
70	9510	Anti-Skate Spring
71	14551	Lift Pin Spring
72	1588	"C" Washer
73	6955	Set Screw
74	5022	"C" Washer
75	6885	Safety Spring
76	6874	Push Rod
77	6883	Thrust Washer
78	2579	Spring, 7" Lever
79	2581	7" Lever
80	9849	Screw
81	6007	Reset Lever
82	2925	Spring, Reset Lever
83	9849	Screw
84	6966	Shut-Off Lever Ass'y.
85	9663	Spring, Shut-Off Lever
86	18773	Retard & Clip Ass'y.
87	16817	Spring, Retard Arm
88	6713	Screw
89	7125	Gear Ass'y.
90	1588	"C" Washer
91	4172	Spring
92	5339	Pawl Lever
93	5338	Pawl Lever Spring
94	2569	Trip Lever Ass'y.
95	4656	Trip Link
96	1588	"C" Washer
97	7121	Slide Ass'y.
97A		Escape Lever(Part of Item 97)
98	2246	Spring, Slide Bearing
99	2211	Slide Bearing
100	9849	Screw
101	6931	Record Support Guide Ass'y.
102	4857	Screw
103	6897	Record Support Shaft
104	7120	Detent Spring & Link Ass'y.
105	2585	Spring, Escape Lever
106	9849	Screw
107	14420	Ejector Bracket
108	9823	Screw

Ref. No.	Part No.		Description
	Alliance Motor	GI Motor	
	18361	18781	Motor Ass'y., Complete, 117V., 60 Cycle
109	18398	19043	Motor Plate Ass'y.
110	5022	5022	"C" Washer
111	7434	6948	Counter Balance Spring
112	9134	9134	Motor
113	1652	1652	"C" Washer
114	2583	2583	Fibre Washer
115	7435	9092	Idler Pulley
116	1652	1652	"C" Washer
117	7437	6901	Idler Link
118	7438	6900	Idler Arm Ass'y.
119	7439	6949	Idler Spring
120	6631	6631	Motor Mtg. Grommet
121	6947	6947	Detent Spring

* Specify Color

AIRLINE

MOTOROLA

BUICK CHEVROLET

MOTOROLA MODELS

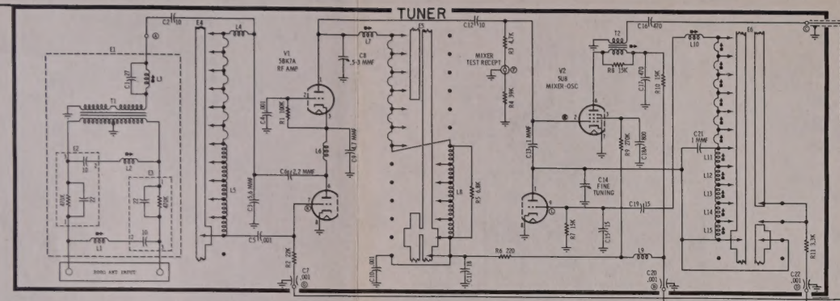
Y17P5-1, Y17P5-2,

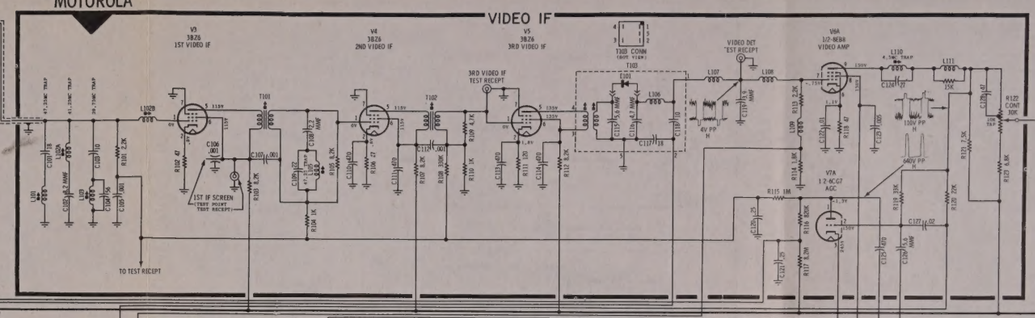
Y17T32BZ, 17P5-1,

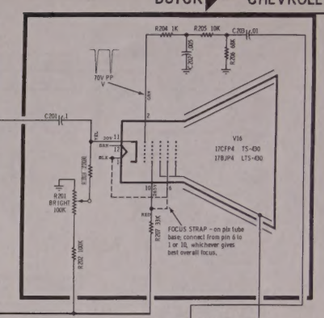
17P5-2, 17T32BZ,

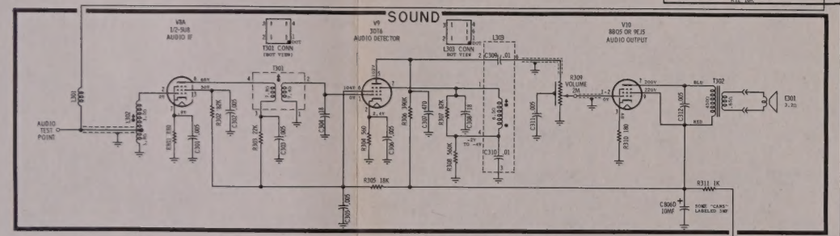
17T33B, 17T33M

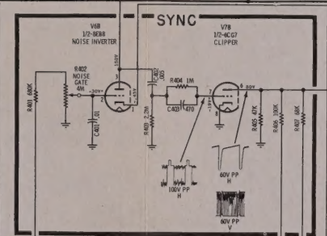
(Ch. LTS-430, TS-430, Y)

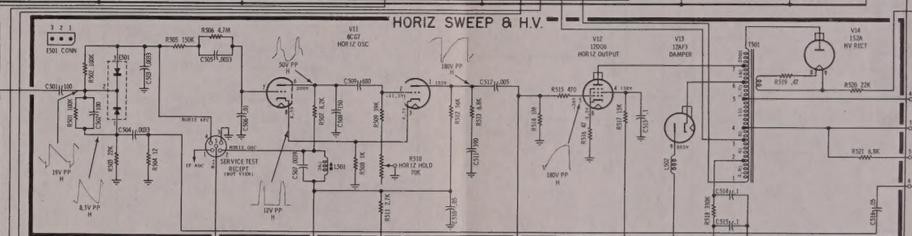


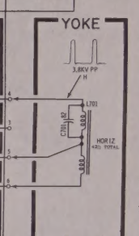

VIDEO IF
V3 3B26 1ST VIDEO IF
V4 3B26 2ND VIDEO IF
V5 3B26 3RD VIDEO IF
3RD VIDEO IF TEST RECEPT
VIDEO DET TEST RECEPT
V6A 1/2-6EB4 VIDEO AMP
V7A 1/2-6CG7 AGC
TO TEST RECEPT

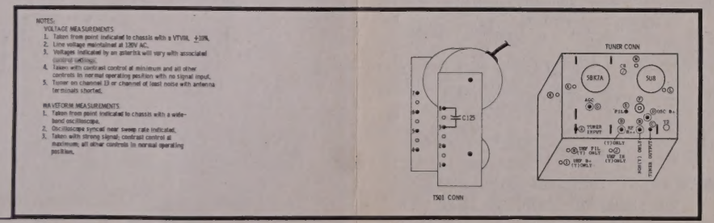

V16 17CFP4 TS-430 17BJP4 LTS-430
FOCUS STRAP - on pix tube base, connect from pin 6 to 1 or 10, whichever gives best overall focus.

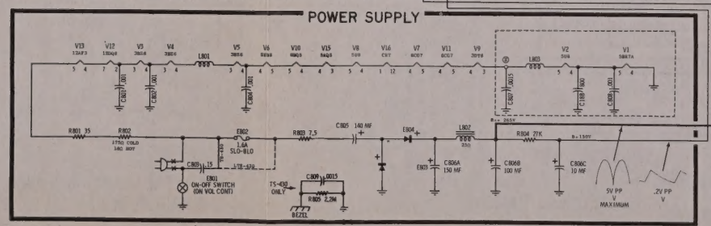


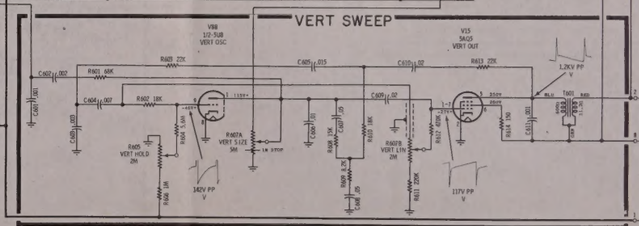












Schematic Diagram Courtesy of MOTOROLA INC.

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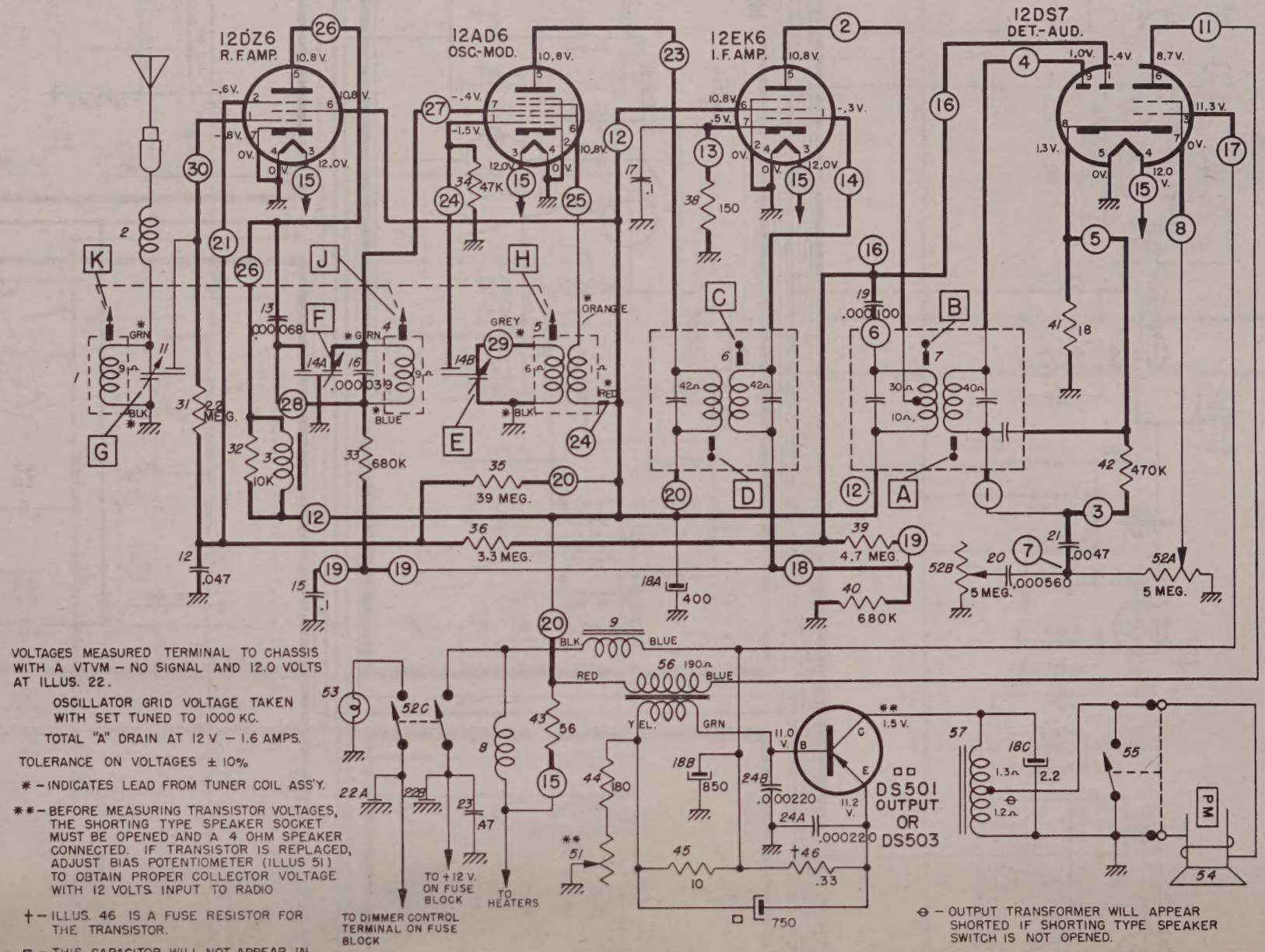
Schematic Diagram Courtesy of DELCO RADIO DIV., GENERAL MOTORS CORP.

CHEVROLET MODEL 987888



VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM – NO SIGNAL AND 12.0 VOLTS AT ILLUS. 22.

OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.

TOTAL "A" DRAIN AT 12 V – 1.6 AMPS.

TOLERANCE ON VOLTAGES ± 10%

* – INDICATES LEAD FROM TUNER COIL ASS'Y.

** – BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS 51) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO

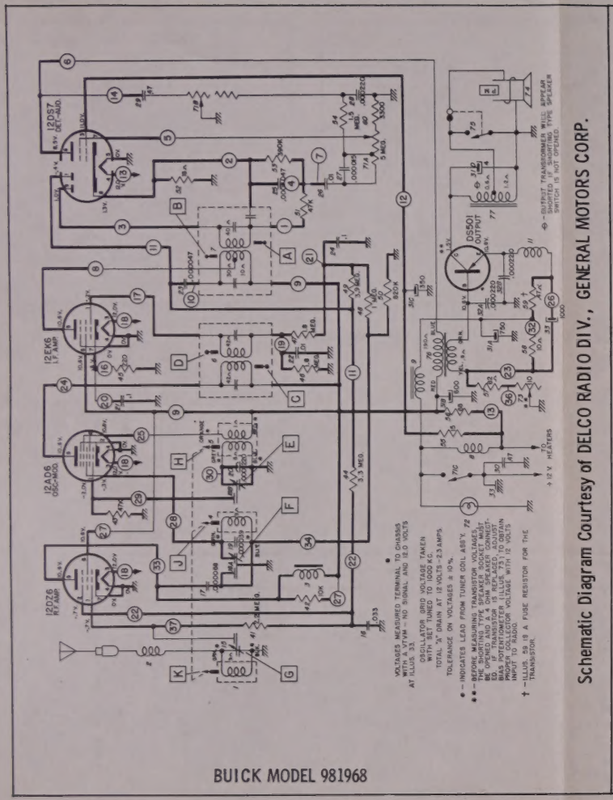
† – ILLUS. 46 IS A FUSE RESISTOR FOR THE TRANSISTOR.

□ – THIS CAPACITOR WILL NOT APPEAR IN ALL RADIOS. IT SHOULD BE REMOVED IF TRANSISTOR IS REPLACED.

⊖ – OUTPUT TRANSFORMER WILL APPEAR SHORTED IF SHORTING TYPE SPEAKER SWITCH IS NOT OPENED.

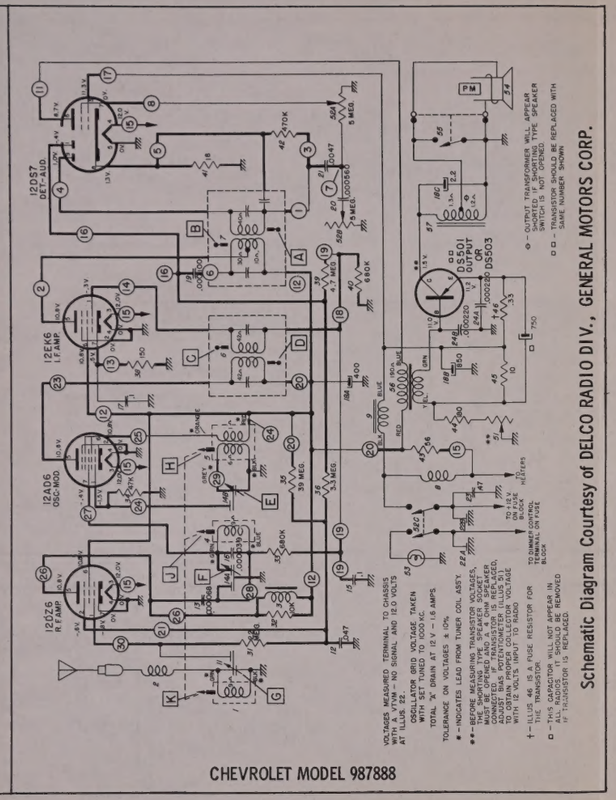
□□ – TRANSISTOR SHOULD BE REPLACED WITH SAME NUMBER SHOWN

Schematic Diagram Courtesy of DELCO RADIO DIV., GENERAL MOTORS CORP.



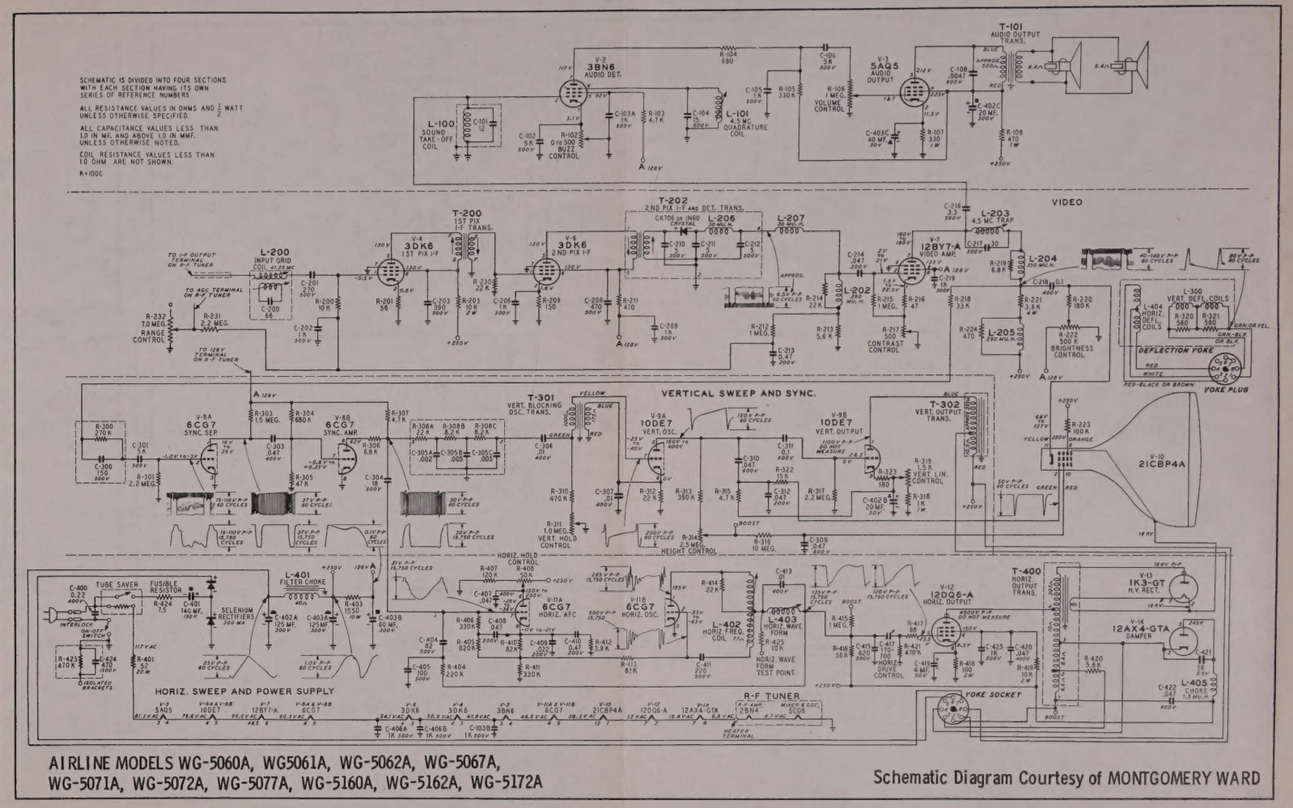
Schematic Diagram Courtesy of DELCO RADIO DIV., GENERAL MOTORS CORP.

BUICK MODEL 981968

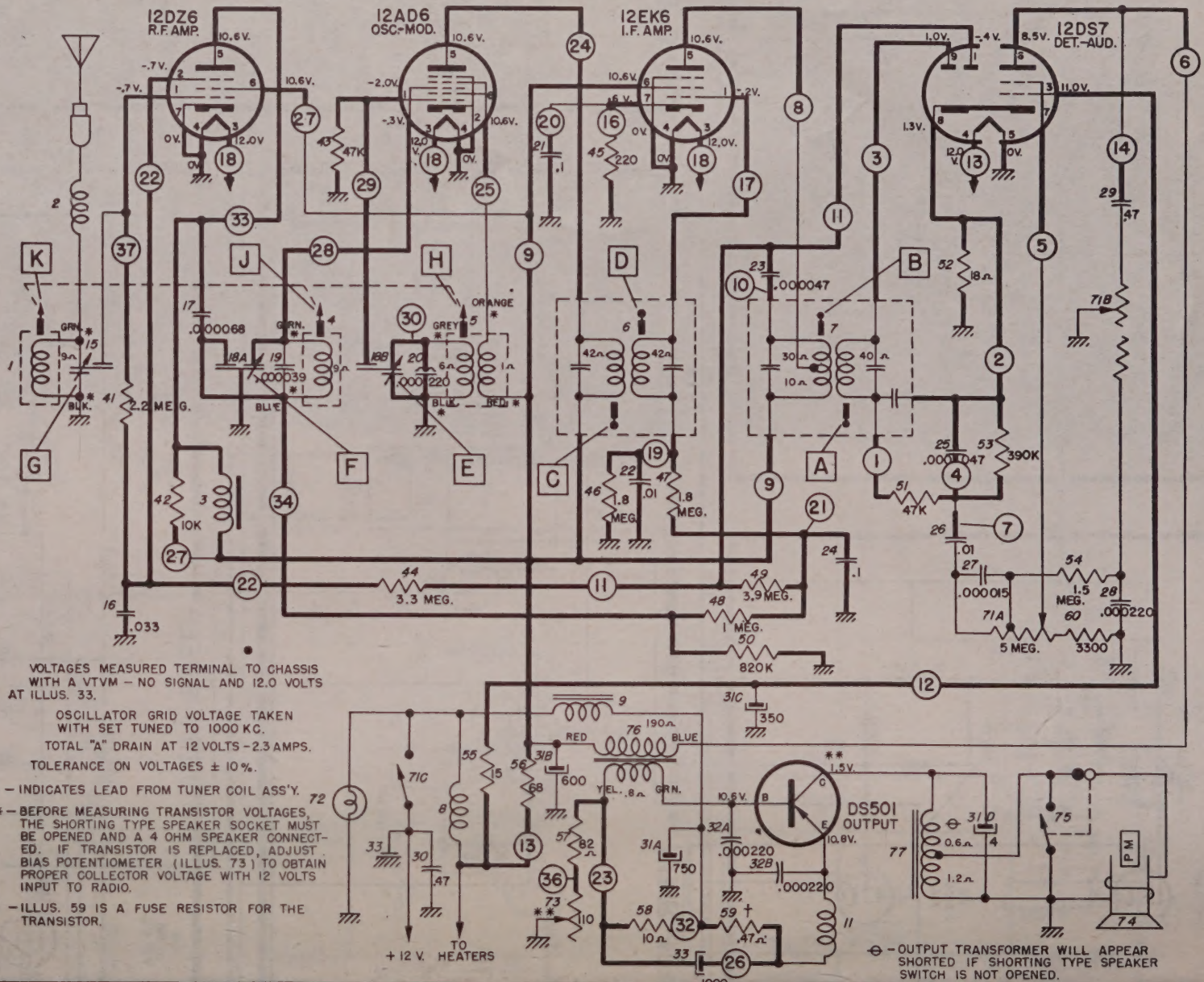


Schematic Diagram Courtesy of DELCO RADIO DIV., GENERAL MOTORS CORP.

CHEVROLET MODEL 987888



AIRLINE MODELS WG-5060A, WG5061A, WG-5062A, WG-5067A,
WG-5071A, WG-5072A, WG-5077A, WG-5160A, WG-5162A, WG-5172A

Schematic Diagram Courtesy of MONTGOMERY WARD

BUICK MODEL 981968